Environmental Awareness in the Workplace:

A Study of Employees' Environmental Knowledge, Perception and Behaviour from an Individual and Organisational Perspective

Submitted by

Willy Francis Chedjou Jouontso

This thesis is submitted in partial fulfilment of the requirements of the University of Abertay Dundee for the degree of Doctor of Philosophy

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I certify that this thesis is the true and accurate version of the thesis approved by the examiners.

Signed: ..... Date: .....

(Director of Studies)

DECLARATION

I hereby declare that this thesis is my own work and that it has not being the subject of examination which has led to the award of a degree. All additional sources of information are acknowledged by means of reference in accordance with academic convention

27/06/2013

Willy F C Jouontso

Date

DEDICATION

This thesis is dedicated with love in memory of my dad and to my mum for their continual supports, commitments, love and sacrifices...

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My foremost Thank goes to GOD for providing me with the means (health, finance, inspiration and motivation) to complete this study

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ABSTRACT

The study attempts to assess employees' environmental awareness at a personal and organisational level as well as their perception of their organisations' environmental policies in order to propose a theoretical model on environmental awareness. The research focuses on employees' knowledge, perception and behaviour toward the environment. The respondents (composed of 43% males and 53% females) are employed in a variety of industries in the United Kingdom. The objectives of the study are: (1) to demonstrate how employees' environmental awareness and behaviour differs according to their socio-demographic characteristics (i.e. gender, age, parental status, education level, income); (2) to investigate organizations' environmental awareness and actions, as well as factors influencing organisations' environmental decisions; (3) to evaluate the environmental actions of organisations, and to determine if organisations' environmental policies influence employees' environmental knowledge and behaviour; (4) to identify ways of how to improve and promote environmental awareness in the workplace; and (5) to make recommendations for the improvement of environmental awareness and behaviour and hence environmental management in organisations. A quantitative research approach is adopted by the study and data was collected through the use of questionnaires. The analysis of 93 questionnaires (response rate was 31%) revealed that no association exists between people's gender, age, earnings (employment), and parental status and environmental awareness. However, a correlation exists between employees' education level and their environmental knowledge and behaviour. Furthermore, tests revealed that an association exists between employees' parental status and their perception of their organisations' environmental actions. There was also an association between people aged 35 or under and those aged over 35 years old and their environmental knowledge and perception of environmental issues. It is hoped that the research will contributes to knowledge by developing a theoretical model representing the development process of environmental awareness and behaviour. Such model enables employees to acquire sufficient environmental knowledge so that they can engage into pro-environmental initiatives and organisations to fully embrace environmental management policies and practices.

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ABBREVIATIONS

AEVS	American Environmental Value Survey
AOS	Organization of American States
CFA	Confirmatory Factor Analysis
CI	Statistical Confidence Interval
CITES	Convention on International Trade of Endangered Species
COP	Conference of Parties
CSCA	Conference of Southern County Associations
CBNRM	Community based Natural Resource Management
DEFRA	Department for Environment, Food and Rural Affairs (UK)
EA	Environmental Awareness
EJ	Environmental Justice
EM	Environmental Management
EMA	Eco-Management and Audit Scheme
EMS	Environmental Management System
EPA	Environmental protection agency (USA)
EU	European Union
ECE	European Commission on Environment
EEB	European Environmental Bureau
EEA	European Environment Agency
EI	Environmental Impact
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
FAO	United Nations Food and Agriculture Organization
FNPCEL	First National People of Colour Environmental Leadership
GB	Great Britain
GEO	Global Environment Outlook
GRI	Global Reporting Initiative
GB	Great Britain
GNP	Gross National Products
IAIA	International association for impact assessment
IUCN	International Union for Conservation of Nature
IPCC	Intergovernmental Panel on Climate Change
IISD	International Institute for Sustainable Development
ICC	International Chamber of Commerce
INFORSE	International Network for Sustainable Energy
ISO	International Organization for Standardization
IEA	Institute of environmental assessment
IEMA	Institute of environmental management and assessment
IBAC	International business academic consortium

INRM	Integrated Natural Resource Management
JWGSSD	Joint Working Group on Statistics for Sustainable Development
MIT	Massachusetts Institute of Technology
NERC	Natural Environment Research Council
NEP	New Environmental Paradigm
NEETF	National Environmental Education & Training Foundation
OECD	Organization for Economic Cooperation and Development
OAS	Organization of American States
ONS	Office for National statistics
PWC	Price water house coopers
SGBAU	Sant Gadge Baba Amravati University
SD	Sustainable Development
SR	Sustainability Reporting
TBL	Triple Bottom Line
UK	United Kingdom
UN	United Nations
UNEP	United Nations Environment Programme
UNCED	United Nations Conference on the Environment and Development
UNFCCC	United Nations Framework Convention on Climate Change
WCED	World Commission on Environment and Development
WWF	World Wide Fund for Nature / World Wildlife Federation
WCS	World Conservation Strategy
WICE	World Institute for Conservation and Environment
WFES	World Future Energy Summit
WCN	World Conservation Union
WRI	World Union for Protection of Life
WUPL	World Union for Protection of Life
WMO	World Meteorological Organization
WNSF	Women's Network for a Sustainable Future

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

The growing anxiety over the degradation of the planet's ecosystem compels the necessity for more comprehensive and reliable environmental management (Smith, 1993; Hammond *et al.*, 1995). Hence, awareness of environmental issues from citizens and organisations of all nations has become more important than ever before. This awareness has led to the development of an environmental consciousness regarding the planet's ecosystems problems, as well as actions aimed at promoting environmental corrective actions to reverse the degradation process (Adams, 1990; Vitousek, 1994; Root *et al.*, 2003; Jarraud, 2008; Hegerl *et al.*, 2007; Abdul-Wahab, 2008; Cetin and Nisanci, 2010; Aminrad *et al.*, 2011; Baruah *et al.*, 2011). Whilst actions must be taken at an international (UNCED, 1992; UN, 2007) and national level (DEFRA, 2008; EPA, 2011), it has become paramount for sustainability advocates to engage organisations and citizens into environmental management (Robert, 1997; Baudains and Dingle, 1998; Booth, 1998; Zilahy and Milton, 2009). Therefore, this study emerges from the belief that environmental awareness has to be developed among citizens especially those working in organisations (i.e. institutions, corporations, SMEs,

etc), if positive changes are to be made and the planet can be protected from the alleged destruction. Moreover, environmental awareness and behaviour can only be achieved if people are environmentally knowledgeable (Loubster *et al.*, 2001). It is also believed that in teaching and/or in communicating environmental knowledge and awareness, one must consider socio-demographic characteristics (Vorkinn and Riese, 2001; Todd *et al.*, 2006; Chen *et al.*, 2010), culture and values of the stakeholders (Lizuka, 2000; Vorkinn and Riese, 2001; Asmar, 2009). Furthermore, this study is set in a context in which rapid economic growth and human development have negatively impacted on the planet ecosystem. It attempts through the analysis of empirical data collected through the use of questionnaires to (i) investigate the factors that influence environmental awareness and behaviour among employees; and (ii) to examine the relation between organisations and environmental management, including employees' perception of their organisations' environmental policies.

1.2 RESEARCH PROBLEM

Although economic activities are considered as a source of environmental changes (Boulding, 1966; Colby, 1991; Costanza *et al.*, 1991; Esty, 1996), the review of the literature shows a divergence of opinions regarding the origins of the observed environmental destructions. Indeed, some academics and institutions consider environmental changes a direct results of human activities (i.e. Adriaanse *et al.*, 1988; Pearce, 1991; Hammond *et al.*, 1995; Root *et al.*, 2003; Office of the Auditor General of Canada, 2007; Blackman

and Baumol, 2008; WWF, 2010; IPCC, 2010; Rojas-Briales, 2011); while others consider that human are not responsible or that there is not a sufficient evidence(s) to incriminate humans for the continuous environmental changes (i.e. Singer *et al.*, 2003; Veizer, 2005; Legates, 2006; Zichichi, 2007; Allegre *et al.,* 2012). In fact, Ladle *et al.* (2005:239) point out that a 2010 Gallup opinion poll in the USA showed an increasing number of people (47%) believing that climate change is a result of natural means rather than a human's influence; and that more and more people think that NGOs and political leaders use the issue of climate change for their advantage and for political purposes. These divergences do not make it easy to understand the source of environmental degradation and hence the adoption of viable solutions. This study will shed some light on this problem to establish the extent to which humans and their organisations are aware of environmental issues and the appropriate actions needed to address them.

Most recent studies aim, at least in part, to investigate likely solutions to the issue of environmental degradation. Even though some of them (i.e. Inglehart, 1990; Tilikidou, 2001; Patchen, 2006; OECD, 2008; H'Mida *et al.*, 2008; Hunter *et al.*, 2010; Chen *et al.*, 2010) have investigated aspects of the 'societal' behaviour with the environment, very few (i.e. Lizuka, 2000; Kollmus and Agyeman, 2010; Honabarger, 2011; Csutora , 2012; Mageswary and Zurida, 2012) have attempted to investigate and bring to light a more comprehensive picture of individuals and/or organisations' environmental knowledge, awareness and behaviour. Therefore, it is felt that an investigation of organizations' environmental awareness and behaviour as well as employees' awareness would be able to inform and improve the

understanding of decision-makers (national and international) in evaluating and developing their strategies for better sustainable development. Currently, there is little evidence on the characteristics of organizations' and employees' awareness and behaviours toward the environment. Indeed, a great deal of the research focuses on (i) environmental management from a stakeholder perspective (Gadenne *et al.*, 2008: 46); or (ii) on the "determinants of environmental quality and of environmental policies" (Pellegrini and Gerlagh, 2006:6). Therefore, this study aims to find original evidence and contribute to the work which already exists on environmental awareness by determining what claim, if any, can be made about organizations' and employees' awareness of the environmental issues and behaviour toward them.

1.3 AIM AND OBJECTIVES OF THE STUDY

In the context of the research problems stated above, this study attempts to examine the relationship between employees' socio-demographic factors (gender, age, parental status, education, and profession/job type/income) and their environmental awareness. Environmental awareness in this study is defined in relation to three elements: environmental knowledge, environmental perception and environmental behaviour. In other words, this study attempts to establish possible correlations between employees' socio-demographic characteristics and the three elements defining environmental awareness. The study seeks to develop an environmental awareness and behaviour framework which can assist governments and organisations in developing better way to achieve environmental awareness at national and organisational

level. Such framework is developed through an extensive literature review as well as through the identification of key elements which have an impact on an individual or an organisation's environmental awareness. Specifically, this research intends to achieve the following objectives:

Objective 1: To demonstrate how employees' environmental awareness and behaviour differs according to their socio-demographic characteristics (i.e. gender, age, parental status, education level, income);

Objective 2: To investigate organizations' environmental awareness and actions, as well as factors influencing organisations' environmental decisions (including potential difficulties);

Objective 3: To evaluate the environmental actions of organisations, and to determine if organisations' environmental policies influence employees' environmental knowledge and behaviour;

Objective 4: To identify ways of how to improve and promote environmental awareness in the workplace; and

Objective 5: To make recommendations for the improvement of environmental awareness and behaviour and hence environmental management in organisations.

In the light of the above objectives, the relevant literature was reviewed and the following hypotheses were developed:

- $H_2$1: An individual with good environmental knowledge will take pro-active environmental actions;
- $H_2$2: There is a correlation between Environmentally Aware and people's social status;

- $H_3$1: Environmental regulation is the main reason why organisations adopt sustainability practices;
- $H_3$2: Organisations' employees are environmentally aware;
- $H_3$3: There is a correlation between socio-demographic variables and people's environmental awareness;
- $H_3$4: Organisations use their employees to promote sustainability among staff;
- $H_3$5: Sustainable organisations have a better reputation and image among their employees;
- $H_3$6: Environmental facilities available at work and environmental activities conducted at workplaces for the enhancement of environmental awareness of employees are sufficient; and
- $H_3$7: There is a correlation between environmental facilities and activities available at organisations' workplace and their employees' environmental awareness.

1.4 RESEARCH QUESTIONS

In order to achieve the above-mentioned objectives, this study takes a quantitative approach in investigating environmental awareness of employees and their organizations. The following questions are formulated to meet the aim and objectives of the study:

1. Are employees adopting environmentally friendly behaviour at a personal level as well as in their workplaces?

2. Do employees' socio-demographic characteristics influence their environmental knowledge, awareness and behaviour?
3. Are organisations environmentally aware? Are they adopting environmentally friendly methods?
4. Are organizations' employees aware of their workplaces' effects on the environment? And what attitude is adopted by employees in response to their organizations' actions?
5. Does a relationship exist between organisations' environmental facilities as well as activities and their employees' environmental awareness?

These questions, together with the objectives described above, provide the focus of the research and the base for the conclusions that are drawn in the last chapter of this study. The following part presents the steps adopted for the conduct of this study.

1.5 THE CONDUCT OF THE STUDY

In order to answer the research questions listed above and hence meet the research aim and objectives, the appropriate approach for the study had to be selected. Therefore, the current research philosophies and approaches had to be reviewed, with the objective of adopting an appropriate research methodology. Consequently, a positivist paradigm with a deductive reasoning and a quantitative approach have been adopted. A survey research strategy (Gable, 1994; Kelley *et al.*, 2003) has been used and the questionnaire is

employed as the main research method for data collection. In conducting this research, various research phases are followed (presented in the following section) which enable the research to capture data regarding the scope and relative penetration of the studied organisations and respondents: the literature review regarding environmental management and awareness concepts and theories, a distribution of questionnaires for data collection. The result included a large volume of rich data which was analysed using appropriate academic tools (i.e. factor analysis, Chi-square test, the Spearman's rank order correlation, the *t*-test for statistic significance, the binomal regression and the statistical confidence interval).

1.6 THE SCOPE OF THE STUDY

This study is conducted in the United Kingdom and within the context of the current environmental policies and initiatives introduced by the British government. It is well documented that the British government is at the forefront of environmental management (United Nations, 2008, 2011; UNEP, 2002, 2011; DEFRA, 2008, 2011, 2012). As such, one will suppose UK citizens as well as UK organizations to be adopting environmentally friendly behaviours. However, despite the fact that there had been a number of sustainable development programmes including environmental awareness initiatives, a review of environmental issues confirms a history of growing (and recent) environmental problems (Green peace, 2008; DEFRA, 2011; Harrabin, 2011; UK Environment Agency, 2012). Therefore, this study attempts to examine a sample of the British employees' perception, knowledge,

awareness and behaviour toward environmental management. This is particularly important as it would be interesting to see if the British government environmental efforts are influencing or are in line with its citizen's environmental awareness and behaviour especially the employed ones. This study provides information and evidence about environmental management and awareness, and examines key issues associated with environmental management and awareness.

Furthermore, the researcher past experiences with the United Nations Industrial Development Organisation (UNIDO) in Rome (Italy) and Rabat (Morocco) played a significant role in his intention to research in this respect environmental management and to contribute to knowledge. These past experiences involved dealing with environmental projects with African countries (Gabon, Senegal, Egypt, Morocco and Mozambique). As a result, the researcher noticed the lack of environmental management in many organisations (including his own). It is with such prerequisite that this study aim contributed to knowledge by extensively reviewing the literature (with the aim of finding how useful the literature is in relation to this study's aim and objectives and identifying (if any) missing elements in the available literature which would enable this research to make a contribution). In answering all the research questions mentioned earlier, a theoretical contribution could also be made. This study can also offer practical implications and orientations to all environmental 'actors' in the UK and the world (policy makers, organisations' leaders, individuals) whenever they deal with environmental management. The study intends to find factors which will drive governments, organisations and employees to engage in environmentally friendly actions; hence

generating economic benefits to the UK and the world (i.e. the world economy significantly depends on natural resources and the natural environment is a direct source of well-being) and personal benefits for employees (i.e. improved quality of life including health) (Pepper, 1984; Eden, 1996; Hamilton and Atkinson, 1996; Jenkins *et al.*, 2002; Eurobarometer, 2005; Adams, 2006).

1.7 OUTLINE OF THE CHAPTERS

The remainder of the study is organised as follows, Chapter 2 provides a review of the concept of environmental management and awareness. The chapter presents a review of the emergence of environmental management and extends it to the conceptualisations of environmental management and awareness.

In Chapter 3, critical reviews of the theories on environmental management are presented in a chronological order. Contemporary paradigms of environmental management are reviewed with a focus on environmental perception and environmental awareness. Factors influencing environmental management are also reviewed, but with a focus on organisations. Also, elements influencing the adoption of pro-environmental management policies (at an organisational level) are examined.

Chapter 4's objective is to provide a step-by-step account of how the study is conducted. It sets out different types of paradigms, methodology and methods that can be used for conducting social research. In doing so, the chapter

provides brief literature reviews in order to explain the adoption of a positivist paradigm, a deductive approach, and of a quantitative approach. Moreover, ethical concerns faced by the researcher as well as the steps adopted to achieve unquestionable ethical practice are also presented in this chapter.

Chapter 5 deals with the outcome of the application of the statistical techniques to the collected data. In other words, it presents the empirical results from the questionnaire-based survey. The chapter also provides interpretations of the data and presents the evidence from the questionnaire data analyses which will provides ground for discussion in Chapter 6.

Chapter 6 provides an analysis and discussion of the findings presented in Chapter 5. It attempts to link the findings within the perspectives discussed in earlier chapters. The chapter also attempts to compare the findings to existing theories on environmental awareness and behaviours which are discussed in chapter 3.

Chapter 7 presents the key conclusions which emerge from the study. The chapter also discusses the implications of the findings, and suggests possible directions for future research.

CHAPTER TWO

ENVIRONMENTAL MANAGEMENT: CONCEPTUALISING ENVIRONMENTAL MANAGEMENT AND AWARENESS

2.1 INTRODUCTION

The objective of this chapter is to provide a review of the concept of "Environmental Management" which is an aspect of sustainable development (Adams, 2006). Other components of sustainable development include the integrated natural resource management, the environmental impact assessment, environmental justice, gender influence on environmental initiatives, environmental education and the conception of environmental awareness. The chapter commences with a review of the emergence of the notion of Environmental Management and then extends to the conceptualisations of Environmental Management. The review of the literature will move on to the concept of environmental awareness as it is a critical element for the implementation of environmental management, and for the realization of environmental management objectives. Relevant definitions are also provided, and the chapter concludes with remarks on environmental management and awareness.

2.2 ENVIRONMENTAL MANAGEMENT

Environmental advocates argue that the planet is endangered by the multiples ecosystems destructions – these include global warming leading to drought, floods, climatic hazards such as orographic rainfall, hailstorms (DEFRA, 2012). Moreover, the United Nations Environmental Programme confirms environmentalist worries that environmental degradation is increasing and is higher than it was estimated (UNEP, 2002, 2012). Indeed, phenomena such as world population increase, marine resources depletion, increased deforestations, fresh water pollution, soil degradation, atmospheric pollutions, nuclear wastes are increasing (Liu, 2003; Hirazawa and Yakita, 2004; Hui, 2006; López-Gamero *et al.*, 2011). It is in such context that the notion of environmental management emerged. In order to understand the concept of environmental management, it is important to explain the emergence of environmental issues and understanding environmental management as well as the need to promote environmental awareness as explained below.

2.2.1 Emergence of Environmental Issues

Environmental problems are nothing new. Indeed, environmental problems have contributed as much to the fall down of past civilizations as did the normally cited military fates (Colby, 1991:194). Although this concept can be traced to the 18th and 19th century industrial revolution, the notion arose during the 1970s. Indeed, in the seventies, people became more conscious of the damages born by their immediate environment. It led to the enactment of several environmental laws (OAS, 1987; Adriaanse *et al.*, 1988; Baumast, 2001; Blair and Hitchcock, 2001). Moreover, the Brundland Commission's

publication titled "*Our Common Future*" (Brundland and Mansour, 1987) prompted the development of the conception internationally, and led to (i) improved environmental coordination, and (ii) the development of international environmental management standards and guidelines to facilitate global trade (CSCA, 2011:3). However many authors agree that in the last two decades, the menace and realism regarding environmental damages have become more apparent (Meina, 1994; Dincer, 2000; Leiserowitz, 2006; Johnston and Santillo, 2007; Little, 2007; International Union for Conservation of Nature, 2010). It is argued that the growing evidence of ecological issues is due to a combination of various factors: the lack of environmental awareness among stakeholders (i.e. governments, citizens and organizations); the increased globalization of national economies; the exploitation and uses of environmental resources (i.e. deforestation, mineral extraction); and the increasing of the planet's population as well as pollution (at local, regional and international levels); have all reached un-sustainable levels (Colby, 1991; Dincer, 2000; Ekpenyong, 2009). This has lead to growing concerns over the environment (Jenkins *et al.*, 2002) particularly since repercussions (i.e. flooding, maritime pollution, ambient air quality etc.) on humans' way of life are becoming more visible (UN, 2010).

In line with the principle of environmental management, attempts to rectify mistakes have been made through a succession of initiatives aimed at offering environmental guidance to organisations and governments (see Table 2.1 in the following page). For example, as shown in Table 2.1, at international level, some of the initiatives included: (a) the creation of the UN commission on Environment and Development in the 1980s whose objective was to propose

solutions to the continual pollution and exploitation of the planet resources unsustainably; (b) the 1992 Earth Summit in Rio de Janeiro (Brazil) which led to increased cooperation and coordination of environmental initiatives; and (c) the Kyoto Protocol, a direct result of the Rio Summit. The Kyoto Protocol objective was to measure and reduce nations' greenhouse gases emissions and to set binding targets. There were also initiatives at organisational level. For example, the ISO (2011) developed standards which help organisations to improve their effects on the environment. Moreover, the carbon disclosure project was developed between the private and public sector and aims at measuring organisations' greens house emissions as well as helping them reduce such emissions.

Table 2.1 Environmental Initiatives

Environmental initiatives	Aims / Objectives
The Bruntland commission initiative – The World Commission on Environment and Development	The Commission devised an innovative concept in 1987: sustainable development. The concept helped to shape the international community's attitude towards economic, social and environmental development. It also helped to shape the international agenda with regard to environmental practices (Brundland and Mansour, 1987).
The Earth Summit (UNCED, 1992)	The Rio Summit (UN, 1992) led to important developments with regard to environmental treaties especially with the Agenda 21 initiative, an agreement adopted by all participating nations at the summit. The agreement according to UNDSD comprised a list of important measures to be taken by nations to synchronize environmental management at a global level (UNDSD, 2009). Moreover, the adoption of the Agenda 21 by virtually every country on Earth created an unprecedented global partnership to reverse the environmental degradation of the planet (Sitarz, 2008).
The Carbon Disclosure Project (CDP, 2010)	The CDP works with a wide range of organisations including shareholders from various countries. The CDP helps organisations to improve their environmental performance by measuring and disclosing environmental information such as water management system, greenhouse gas emissions; and climate change, etc.
The Kyoto Protocol (UNFCCC, 2011)	The Protocol aims at setting binding targets to industrialized nations for reducing greenhouse gas emissions (UNFCCC 2011).
OECD Guidelines for Multinational Enterprises (OECD, 2011)	These guidelines provide standards for business for responsible practices in areas such as: environment and employment (OECD, 2001).
The ISO 14000 series of standards (ISO, 2011)	The ISO 14000 series are a set of standards which help organisations to address various aspects of environmental management such as: improving their operations effect on the environment, complying with regulations or/and with any other environmental requirements (ISO, 2011).
The 16 Principles for Sustainable Development of the business charter (ICC, 2011)	The Charter aims at committing organisations to improving their environmental performance in accordance with 16 principles developed by the ICC (ICC, 2011).

Source: copied from Brundland and Mansour (1987), UNCED (1992), CDP (2010), UNFCCC (2011), OECD (2011), ISO (2011), ICC (2011)

All the above initiatives aim at promoting stricter environmental policy at corporate, national and international levels as a means for resolving environmental issues (Esty, 1996; Jenkins *et al.*, 2002). Furthermore, all these schemes (see Table 2.1) provide several concepts and theories of environmental management whose objectives are: (i) to document all environmental issues; (ii) to determine and to encourage organisations promoting environmental management; and (iii) to support all schemes which enhance the 'quality of life' of humans and of the nature (OAS, 1987; Meina, 1994; Goodland, 1995; Agarwal, 2000; Loubster *et al.*, 2001; Sayre, 2007; Cetin and Nisanci, 2010; Litrico, 2011;).

2.2.2 Understanding Environmental Management

Barrow (2006) notes that Environmental Management (EM) necessitates a multidisciplinary approach, and the integration of all environmental 'forces' (e.g. citizens, governments, NGOs, etc); while the Sant Gadge Baba Amravati University (SGBAU) (2010) asserts that there is no universal explanation of EM. Colby (1991:194-200), however, conceptualises EM as the optimal relationship between human and nature. He further developed four 'paradigms' of such relationship:

(a) resource management, which represents a symbiotic management of the planet resource by humans in a sustainable way;
(b) environmental protection, which emphasises on rational assessments of the cost and benefits of any development projects which will affect an ecosystem before they start;

(c) economic frontier, which represents an approach that regards nature as an unlimited supply of physical or natural resources (e.g. minerals, energy, air, water); and

(d) deep ecology, which is an attempt to fuse philosophical approaches (both old and new) regarding the human relationship with nature, with a focus on social, ethical, and religious aspects.

Colby's arguments are shared by many authors (Grey, 1993; Asher, 2000; Andrews *et al.*, 2001; Daily and Huang, 2001; Vanclay, 2004; Thampapillai *et al.*, 2007; Blackman and Baumol, 2008; Zhao, 2009; Taylor and Zimmerman, 2011) presenting concepts which will be studied in the following parts of this chapter. Before analysing the different environmental management conceptualisations, defining the relevant terminologies is essential.

The environment: The Oxford dictionary defines the environment as "the natural world, as a whole or in a particular geographical area, especially as affected by human activity" (Oxford, 2011: 1). Cole (2007: 39) considers the environment as "a place rich with dynamic cultural, social, economic, political, historical contexts and perspectives that frame and construct the ecological processes within them".

Environmental management: Lorrain-Smith (1982) defines environmental management as "action taken by society, a section of society and an organisation to improve environmental quality by developing plans, implementing them and continuously reviewing such plans" (in Huang and Shih, 2009: 36). Environmental management "seeks to steer the development

process to take advantage of opportunities, try to avoid hazards, mitigate problems, and prepare people for unavoidable difficulties by improving adaptability and resilience" (Erickson and King, 1999; cited in International Network for environmental management website, 2011). Environmental management can be considered as "a decision-making process which regulates the impact of human activities on the environment in such a manner that the capacity of the environment to sustain human development will not be impaired" (Barrow, 2006: 6). Pahl –Wostl (2007:561) defines environmental management as a "purposeful activity with the goal to maintain and improve the state of an environmental resource affected by human activities".

Based on the abovementioned definitions, environmental management exhibits the following characteristics: (i) it is a decision making process; (ii) it supports sustainable development of human activities; and (iii) it stresses stewardship as an alternative to exploitation. Barrow's definition provides a generic and multidisciplinary explanation of the term which is essential for the purpose of this study. The next part focuses on the conceptualization of environmental management.

2.2.2.1 Promoting Environmental Awareness

In realisation of all the growing environmental problems scientists and academics (e.g. Dincer, 2000; Gupta, 2000; Durga, 2004; Mukherjee, 2002; Okotoni, 2004; Ekpenyong, 2009; Ko *et al.*, 2011) have proposed to focus on social awareness and participation with regard to the prevention, protection and regeneration of the environment. For instance, Loubster *et al.* (2001: 318) defined environmental awareness (EA) as "the capacity to perceive and

interpret the relative health of the environmental systems and to take appropriate action to maintain, restore or improve the health of those systems". Also, Mascaro and Scott (2008: 46) defined environmental awareness as "bringing sustainability into the consciousness of ...staff"; while Ekpenyong (2009) regards environmental awareness as the acquisition of knowledge which leads to concerns regarding the preservation and improvement of the natural environment. Moreover, Ziadat (2010: 136) consider that environmental awareness is the "levels of knowledge that different groups of people possess concerning the severity of environmental problems and how they respond to or interact with their environment".

Gupta (2000) and Ekpenyong (2009) argue that awareness of nations' leaders/governments is essential in creating efficient environmental management mechanisms. In fact, the Daily observer (2009) notes that during the Kyoto Protocol Conference in Japan, African negotiators had limited understanding of environmental issues at stake. Therefore, they were not able to make significant contribution to the consultations regarding climate change. Hence, Gupta (2000) observes that an aware government can play an essential role with regard to creating awareness among all classes of citizens trough for instance education (Loubster *et al.*, 2001) and policies (Linde, 1995; Gurtoo and Antony, 2006; Hasnas, 2009; Ekpenyong, 2009). Furthermore, Mukherjee (2002) and Okotoni (2004) argue that one of the ways to create environmental consciousness is to encourage research programmes on the subject of environment. Attfield (1999) also stated that citizens' participation is paramount if the world is to properly address the urgent and growing environmental problems. Furthermore, EA is regarded as an end result of a

long process which requires knowledge of environmental problems, knowledge of how to remediate such issues and actions (Ziadat, 2010; Stern, 2000). Therefore, prior to examining the perspective of environmental awareness, this study will review the emerging concepts of environmental management as they lead to environmental awareness. Firstly, the following section focuses on conceptualising environmental management.

2.3 CONCEPTUALIZING ENVIRONMENTAL MANAGEMENT

There is a growing literature on the concept of environmental management from several disciplines (Loubster *et al.*, 2001) with many offering different approaches to resolving environmental problems. This has generated complex and diverse sets of interrelated ecological concepts such as: the sustainable development (Ott, 2003; Liu, 2010), the integrated natural resource management (UNEP, 2002; Campbell *et al.*, 2001), the environmental impact assessment (Mahayri, 1999; Zhao, 2009), the environmental management system (Klassen and McLaughlin, 1996; Cetin and Nisanci, 2010), environmental accounting (Gray, 2002; Ballou *et al.*, 2006; Unerman, *et al.* , 2011), environmental justice (Crawford, 1996; Kibel, 2007), environmental ethic (Cochrane, 2006; UN, 2011), gender influence on sustainability (Agarwal, 2000; Seniloli *et al.*, 2002), environmental education (Gadenne *et al.*, 2009; Aminrad *et al.*, 2010), and environmental awareness (Gupta, 2000; Durga, 2004; Mukherjee, 2002; Okotoni, 2004; Abdul-Wahab, 2008; Ekpenyong, 2009; Hsu, 2011). This chapter provides a critical analysis of some of the preceding perspectives as follows.

2.3.1 The Concept of Environmental Sustainability

In the last thirty years the sustainability conception has revolutionized the environmental management field and remains one of the most referenced concepts (Daly and Cobb, 1989; Goodland, 1995; Goodland and Daly, 1996; Bartlett, 1998; Senecal *et al.*, 1999; Commonwealth of Massassuchetts, 2002; Agyeman, 2004; Adams, 2006; Blackburns, 2007; Melville, 2010; Liu, 2010; DEFRA, 2011; Moldan and Janousková, 2011). In 1987, Brundland and Mansour (1987) converted the word 'development', into 'sustainable development'; which other authors (e.g. Hammond *et al.*, 1995; Ott, 2003) refer to as 'sustainability'. The term "sustainable" was first drawn in the 18th and 19th century by foresters from Europe. These forester mixed agricultural and forestry concept through expression such as "their yield could be sustained" (Bartlett, 1998:7). The expression 'sustainable development' was soon applied in many areas by various scholars and scientists. However, Ott (2003: 59) expresses his dismay regarding the mis-usage of the concept by some scientists and politicians in an "indiscriminate and arbitrary way". Hence, unambiguous definitions and clarification of the term 'development' and 'sustainability' are defined below in order to improve our understanding of the concept of environmental sustainability.

Development: The Joint Working Group on Statistics for Sustainable Development (JWGSSD) provides two definitions of the term as follows: (1) "It is an increase in well-being across the members of a society between two points in time" (JWGSSD, 2008:19) and (2) "processes that threaten environmental robustness as negative even if they benefit people" (JWGSSD,

2008:18). According to the United Nations Development Programme (UNDP), development is "to lead long and healthy lives, to be knowledgeable, to have access to the resources needed for a decent standard of living and to be able to participate in the life of the community." (UNDP, 1999, 2000, 2001)

Sustainability: Bartlett (1998:7), states that the term 'sustainability' or 'sustainable' should be defined as "for an unspecified long period of time". Moreover, according to Ott (2003:60), sustainability "means that present and future persons have the same right to find, on the average, equal opportunities for realising their concepts of a good human life". For humans, sustainability is the long term maintenance of their wellbeing and which includes the environment, the economic as well as social dimensions (Adams, 2006).

Sustainable development: It is "an approach to progress which meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundland Commission, WCED Report, 1987:8). Sustainable development (SD) is also "interpreted as development that can continue forever or at least for a very long time; say, for several generations" (JWGSSD, 2008:3). Munasinghe (2004:1) considers SD as a "process for improving the range of opportunities that will enable individual human beings and communities to meet their needs as well as to achieve their aspirations and full potential over a sustained period of time, while maintaining the resilience of economic, social and environmental systems".

The Brundland Commission's definition of SD mentioned above is vague, imprecise and could be given various plausible interpretations. Whereas,

Munasinghe (2004) definition is precise and it clearly highlights the core element of the conception (social, economic, and ecology). Also, it emerges from the definitions that sustainability and sustainable development are two similar perspectives. Hence justifying the use of one or the other by advocates of sustainable development such as DeYoung and Sprague (2001), Clausen *et al.* (2001) and Ott (2003). Furthermore, Kates *et al.* (2005) argue that environmental sustainability is an essential part of sustainable development. In fact, they are interrelated as no development is possible if it is based on environmental deterioration. Also, the environment cannot be protected when for the sake of growth, environment destruction is ignored (Lizuka, 2000). On that basis, the UN (1992, 1998 and 2011) recommends that governments and organisations adopt environmental sustainability in their development projects.

2.3.1.2 Approaches to Sustainable Development

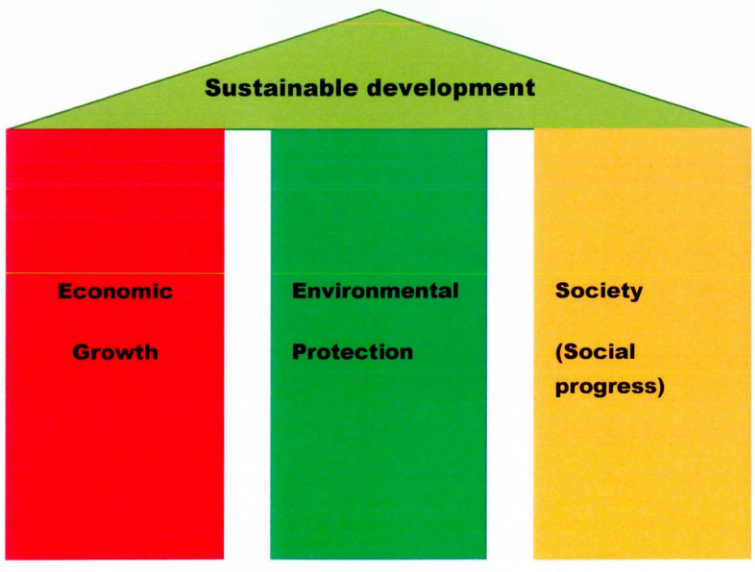
Sustainable development is a 'vicious cycle'. Indeed, sustainable development is not easy to attain without the growth of the economy or of the population which in turn is difficult to accomplish without environmental deterioration (Bartlett, 1998). Nevertheless, it is generally accepted that sustainability requires a convergence between three pillars (represented in Figure 2.1): environmental, social and economic sustainability (Ott, 2003; Adams, 2006; Drexhage and Murphy, 2010). Based on Figure 2.1, evidence of interrelation and of overlapping between the economic growth, the environment and the social progress is revealed (requirements of sustainable development). For instance, sustainability relies on human ability to:

(a) Promote a sustainable and efficient economy. Munasinghe (2004) argues that such economy should be efficient, should be stable and should grow.

(b) Obtain better social benefits. Kates *et al.* (2005) list these benefits as: equity and poverty alleviation, whereas Munasinghe (2004) also adjoins full employment, security, education, wellbeing, participation and cultural identity

(c) Consuming fewer environmental assets or natural resources (Lizuka, 2000); the objective is to attain better natural resource management (Cabezas *et al.*, 2005), Conservation of ecosystems (Ott, 2003; Adam, 2006), and a healthy environment for mankind (Lizuka, 2000; Ott, 2003; Munasinghe, 2004).

Figure 2.1 - An Illustration of Sustainability/Sustainable Development



Source: Adams, W. M. (2006:2), The future of sustainability: re-thinking environment and development in the twenty-first Century, *IUCN Report, The World Conservation Union*

2.3.1.3 Measuring Sustainable Development

From sustainability rises the question of its measurement (Bartlett, 1998; Johnsson-Latham, 2007). Moldan and Janousková (2011) consider indicators as the most useful and common tools used for measuring sustainable development. Johnsson-Latham (2007: 23) states that there are large numbers of sustainability indicators available (see Appendix C), and he adds that such indicators have diverse functions and lack in terms of uniformity amongst nations' which have their own sustainable indicators. On that basis, the United Kingdom developed as set of 68 indicators which includes measurements of greenhouse gas emissions, electricity generation, carbon dioxide and other emissions, resources use, wastes, natural resources, contextual indicators, society, employment and poverty, education, health, mobility and access, social justice, international and wellbeing (DEFRA, 2013). However, the UN proposed a smaller set of sustainable development indicators (see Appendix B), which are considered appropriate for comparing performance among countries (UN, 2008). The UN 'small set' comprises 28 indicators which is a large number of information to monitor especially for some developing countries, including some organisations. Interestingly, the Swiss Agency for the Environment proposes a set of 17 indicators (see Table 2.2 in the next page) and Johnsson-Latham (2007) asserts that the Swiss Agency indicators can be applied internationally. The Swiss Agency (2008:3) indicators are based on a set of four universal questions; and the indicators are expected to answer the questions. Hence, answering positively to question 1 which is: Meeting the basic needs: how well do we live? – depends on achieving good scoring at indicators such as unemployment figures,

income development, level of violence in the society and the mental health figures. The same principle applies for the remaining questions.

Table 2.2 - Swiss Agency Proposed Set of Sustainable Development Indicators

Sustainable development questions	Indicators
1. Meeting needs – How well do we live?	Mental health
	Income development
	Violence data
	Unemployment figures
2. Justice – How are resources distributed?	Poverty level statistics
	Foreign aid data
	Gender pay gaps figures
3. Resource conservation – what are we passing down to our children?	Teenage education data
	National debt
	Investments
	Science and development activities
	Habitat diversity
	Land use
4. Decoupling – How efficient are resources being used?	How transport is increasing faster than GDP
	Private versus Public transport
	Fossil fuel consumption per capita
	Material consumption

Source: Swiss Environmental Agency. (2008:3), Sustainable Development- A Brief Guide 2008, Swiss Agency for Development and Cooperation, *Federal Office for the Environment*

Using these indicators can help improve nations' level of pollution and monitor their actions toward sustainability as they can provide succinct but complete illustration of the vast quantity of environmental data a country or organisation may generate (Moldan and Janousková, 2011). However, it is important to stress that sustainable development can only be achieved at global level and requires "integrated and co-ordinated interaction" (Robinson, 2000: 93) of all nations and all active stakeholders (i.e. national government, organisations, community) at international and national levels. The sustainability conception is subject to criticisms amongst scholars. The part below will present the views of the conception's critics.

2.3.1.4 Critiques of Sustainability

As stated in the preceding section, although nations have now endorsed the Brundtland Commission conceptualisation, some scholars (Hamilton and Atkinson, 1996; Esty, 1996; Bartlett, 1998; Kates *et al.*, 2005) consider it to be an elastic and imprecise perspective as well as being subject to a variety of interpretations. For instance, the Organization of American States (OAS) (1987) considers that any development can only be negative as it threatens the environment natural cycle even if they benefit people, which is precisely what the conception aims for. Moreover, Esty (1996) argues that sustainable development is threatened by the many environmental treaties, the secretariats and the various UN bodies all qualify for addressing environmental issues. In short, according to Esty (1996: 111), world leaders and their institution are "attempting to respond to global environmental problems with a cluster of inadequate and uncoordinated institutions". Furthermore, following OAS (1987) opinion, Bartlett (1998) believes that the two elements of the concept of development (growth) and sustainability are conflicting terms. Undeniably, Bartlett (1998) points out that an economic growth cannot be sustainable as an increase in economic activity automatically leads to an amplifying of consumption levels regarding natural resources (including non-renewable resources). Besides, Bartlett (1998) argues that the Brundtland Commission Report's discussion of "sustainability" does not offer suggestions regarding actions that could help reverse the situation. As a result, Bartlett (1998) condemns the mis-usage of the concept by many so-called experts including politicians. He states that "one would see political leaders using the term 'sustainable' to describe their goals as they

worked hard to create more jobs, to increase population, and to increase rates of consumption of energy and resources" (Bartletts, 1998:7).

A further criticism comes from Kates *et al.* (2005) who argue that sustainable development is a limited perspective because it is affected by: (a) the actual state of technology in our society and societal organisation; (b) our environmental resources; and (c) the capability of the planet biosphere to soak up human negatives activities. Whilst referring to Esty's (1996) view that the concept is threatened by many environmental treaties, Adams (2006) states that sustainability can certainly convey people for debate but it does not necessarily lead to having them agreeing on goals leading to lesser actions. Moreover, Adams (2006:3) argues that the conventional understanding of sustainability which is often based on the interrelation of the three pillar (i.e. economic, the social and the environment) is inconsistent because it implies that trade-offs can constantly be made between ecological, social and economic elements of sustainable development.

Lastly, the frequently cited criticism is that there is no established approach to defining the scope to which sustainability is being attained in any agenda. Consequently, time and again, sustainability projects end up being "development as usual with a brief embarrassed genuflection towards the desirability of sustainability" (Adams, 2006:4).

Moreover, many other approaches derive from the sustainability conception as presented earlier. Munasinghe (2004) classifies such approaches into three different categories with each approach having its own distinctive fundamentals and objectives:

(1) the ecological approach, which regroups approaches, centres on the stability, viability and protection of the physical and biological structure of the planet's ecosystem;

(2) the economic approach which regroups concepts aiming for efficient economic growth and sustainable use of the Earth's limited resources;

(3) the social approach which regroups approaches focusing on the stability, the protection and preservation of social and cultural diversity across the planet.

According to Munasinghe (2004), the intra-generational impartiality and inter-generational fairness are vital features of these approaches. Munasinghe's (2004) classification is widely used among authors and institutions (Kates *et al.*, 2005; Ferreira *et al.*, 2008; UN, 2011). Thus the next part will review concepts of environmental management based on Munasinghe's (2004) classification: the social, the economic and the ecological.

2.3.2 The Social Approach to Sustainability

The advocates of this approach attempts to preserve the cultural identity and diversity, the full employment, ethical objectives (poverty alleviation, equity, and wellbeing for all) and the participation of the populace in a sustainable manner (see Bryant, 1995; Crawford, 1996; Gupta, 2000; Coyle, 2005; Leiserowitz, 2007; Little, 2007; Agostino, 2010). Under this approach are conceptions such as: Environmental Justice (Kaswan, 1997; Stephens, 2007; Adebowale, 2009), Gender influence on sustainability (Nieves Rico, 1998; Coyle, 2005; OECD, 2008; Learned, 2011), and Environmental Education (Orr, 1992; Tilikidou, 2001; Moody *et al.*, 2005).

2.3.2.1 Environmental Justice (EJ) Conception

Environmental Justice which is also referred to as Environmental Equity (Cutter, 1995; Kibel, 2007) emerged in the early 1980s in the Warren County (North Carolina, USA) during the civil right movements when the state of North Carolina selected the Shocco Township to host a polychlorinated biphenyl facility; a well known hazardous chemical (Cole, 2007). In its early days, the concept campaigners aspired to rectify the unequal distribution of ecological burden and prejudices regarding the location of hazardous-waste's facilities (Crawford, 1996). Undeniably, a study by the United Church of Christ Commission for Racial Justice (1987) in America established that a high level of institutionalized racism or "environmental racism" (Kibel, 2007:3) existed regarding the location of several dangerous waste facilities in specific areas minority population. The study observed that a stronger correlation existed between an area's zip or postal code and residents' earnings/income (Crawford, 1996:104). Thus, it highlights the importance of EJ, which advocates for a considerable protection for the environment and an equitable distribution of environmental benefits (Commonwealth of Massachusetts, 2000) through the participation of all people regarding the implementation and enforcement of environmental regulations (Federation for Community Development Learning, 2011). EJ brings together two rarely connected concepts: the 'environment' and 'justice' (Kaswan, 1997). According to Kaswan (1997:229), the concept of environment in the environmental justice signifies "the attributes of the physical environment that affect any aspect of a community well-being"; while she refers to "justice" as the unequal burden of ecological hazards (due to the discriminatory manner of decision-makers) in

which ecological choices are made when the environmental risks are to be supported by low-income and minority communities. However, the Council on Environmental Quality (1997:8) defines EJ as "concerns that may arise from impacts on the natural and physical environment, such as human health or ecological impacts on minority populations, low-income populations...or from related social or economic impacts". Whereas, Stephens (2007:1) regards EJ as "*a concept that links the environmental health science documenting these harms to debates around rights, justice and equity. It fundamentally deals with the distribution of environmental goods and harms- and look at who bears those harms and who is responsible for creating those harms, in both a practical sense but also in terms of policy decisions*". However, the USA Environmental Protection Agency (2011:1) describes EJ as "the fair treatment and meaningful involvement of people of all races, cultures, incomes and educational levels with respect to the development and enforcement of environmental laws, regulations, and policies*".* Therefore, it can be concluded that the definitions establish a linkage between environmental degradation, hazards and risk analysis not just from the perspective of nature but also from a social perspective.

2.3.2.1 Principles of Environmental Justice

The publication of the 17 principles of EJ (See Appendix A) by the First National People of Colour Environmental Leadership (FNPCEL) Summit in 1991 lead to the introduction of Environmental Justice in the USA regulatory system. The EJ movement expanded outside the USA where it began and is currently applied internationally (Stephens *et al.*, 2001; Brodsky, 2007). For instance, the British government included in 2005, EJ and equality as one of

the indicators for measuring quality of life. Moreover, the concept is incorporated in many nations' environmental regulations and features in a number of environmental agencies reports such as the DEFRA in the UK, The European Environmental Agency and the Namibian Directorate for Environmental Affairs. In some cases, it is included in nations' constitutions such as the Constitution of the Republic of South Africa (Loubster *et al.*, 2001; Stephens *et al.*, 2001).

Cutter (1995) acknowledges the FNPCEL principles and considers that EJ addresses three mains environmental injustices:

(1) The social injustice (i.e. influence of class, gender, ethnicity, political power and economic factors such as income);

(2) The generational injustice (i.e. bringing justice and fairness to future generations from past and existing practices); and

(3) The procedural injustice (i.e. applying regulations, international treaties including sanctions in an unbiased way).

Kaswan (1997:223) adds that the EJ conception refers to two forms of justice: (i) "distribution justice", which represents a fairness and impartial distribution of ecological benefits and concerns; and (ii) "political justice" which represents a fair and unbiased decision-making process regarding the distribution of ecological benefits and concerns. Nonetheless, communities' claims of political injustice or unfair treatment are difficult to prove as the correlation between social and environmental inequality is not obvious to detect or notice (Pádua, 2003).

Cutter (1995), and Kaswan (1997) views on EJ are related to cases from the European Union. For instance, there is undeniable evidence which suggests minority groups of non-European descent including Gypsies are suffering from environmental inequality and discrimination (Environmental Justice Foundation, 2011). On that basis, the Council on Environmental Quality (1997) developed six principles for government authorities/offices to achieve impartial decision making (see Table 2.3 below). These principles act as guidance for authorities (i.e. local government, government agencies, and ministries) during their decision process. By obliging the decision-makers to follow numbers of criteria, to perform certain types of analysis/research, and to justify their decisions, these guidelines help achieve environmental justice. Indeed, EJ is achieved through reducing any misunderstandings, evading potential conflict, enabling a working cooperation between the public and the authorities, educating the public and decision-makers as well as protecting the environment (Council on Environmental Quality, 1997).

Table 2.3 General Principles for Achieving Environmental Justice

1. Systematically establish if social classes (low-incomes), minority populations are present in the location of a planned project. If so, establish if they may be disproportionately affected by the project including environmental effects
2. Methodically collect and assess relevant data on public health, industry data in the area. Assess whether there is a possibility for cumulative exposure of the affected population (i.e. minority and low incomes) to environmental hazards. Historical pattern of exposure to environmental hazards and a study on possible human health impact should be carried out in the area's population
3. Acknowledgement of the interrelated social, cultural, occupational, historical, or economic factors that may amplify the natural and physical environmental effects of the proposed governmental authority action
4. Develop and nurture successful and efficient public participation strategies as early as possible regarding a proposed project, and seek actively to outreach the affected population
5. Guarantee community representation in the decision-making process (a significant presence). The government authorities must take into account the various constituencies within any particular neighbourhood seeking community representation. Moreover, the authorities should aim at having the entire community represented
6. Seek local government representation in the decision making process in a manner that is consistent with the government-to-government relationship between the state and local governments.

Source: Council on Environmental Quality. (1997:9), Environmental Justice – Guidance under the National Environmental Policy Act, *Executive Office of the President, Washington: USA*

2.3.2.1.2 Critiques of Environmental Justice

Torres (1993) asserts the unlikeness of the claims that some community locations are targeted because of their race, income level or minority status. He argues that it has more to do with their non-participation, lack of political force and economic resources that leave many communities defenceless against government authorities' decisions to locate hazardous facilities in their communities. He added that most decisions made by the authorities are based on others factors such as economic reasoning, the suitability of an area (on a geologic point of view) and the political climate.

Also, Foreman (1998:3) argues that the major weaknesses of the EJ conception are:

(a) The empirical data for supporting EJ claims are weaker than the conception advocates assert, and this lack of supportive evidence hinders justification for EJ demands;

(b) EJ is motivated by communities' empowerment desires for societal justice and for their wellbeing and these are concerns which a nation cannot alleviate under the guise of EJ;

(c) EJ defenders deflect communities' attention from issues with greatest threats and by doing so they are undermining the public of those communities; and

(d) EJ diverts communities' attention from more serious environmental risks and problems and may thereby cause more harm than good.

Furthermore, the most recurrent criticism is the suggestion that EJ is an unlikely marriage and is ill-defined as it is predisposed to apply 'civil right'

approaches to any problems (Kaswan, 1997; Hayward, 2003). Moreover, in the UK, EJ advocates complaint about barriers such as (i) high legal costs which makes it affordable for the wealthy only; (ii) the lack of government's data for measuring efficiently if EJ is going in the right or wrong direction (Adebowale, 2009; Environmental Justice Foundation, 2011).

Although EJ advocates may have not always won their EJ cases; the foregoing information about this conception demonstrate that they have achieved success by: (a) increasing public involvement in local political decisions regarding projects; (b) increasing public's awareness (nationally and internationally) on communities' struggles on the issue by, and (c) bringing EJ debates into "mainstream discourse" (Brodsky, 2007:6)

2.3.2.2 Gender and Sustainability Conception

According to Agarwal (2000), Seniloli *et al.* (2002); Johnsson-Latham (2007), and the Women's Network for a Sustainable Future (WNSF) (2007), gender has a positive influence on sustainability results because that the distinctness of women (e.g. better social networking ability and greater group homogeneity) to men provide them with the basis for better sustainable environmental management; thus achieving sustainability requires a gender perspective view. This view is supported by various international institutions. For example, the UNESCO (2002) states that women are frequently responsible for most agricultural productions in various countries and they have acquired skills and knowledge in managing natural resources. It is therefore rightly so according to the UN agency that gender inclusion in assessing challenges and solutions for sustainable development is required.

Furthermore, the World Bank proclaims that women play a vital role in sustainable development. Also, the OECD (2008:73) considers gender as a significant feature to be considered when searching for ways to mitigate ecological damages. Moreover, many authors (Martine, 1997; Johnsson-Latham, 2007; OECD, 2008; Agostino, 2010; Learned, 2011) assert that males and females consider and deal with sustainability differently and they cite various justifications. Moreover, they argue that women are more environmentally aware than men due to their gender. The foregoing views can be classified into seven 'paradigms', advocating for a gender perspective with regards to sustainable development. These paradigms are reviewed below.

1. The feminine traits element

According to Martine (1997) women's efforts to deal with the ecosystem problems has given rise to nature feminism or eco-feminism (Nieves Rico, 1998). Martine (1997) states that some 'ecofeminists' consider that women and nature are similar; and it is because women bodies as well as the natural environment have the capacity to reproduce and give life. Such relationship with the environment is non-existent when considering men. On a different note, Johnsson-Latham (2007), argues that women's traits mean that they are more inclined to use more of their own time and money in caring for others, while men spend a large part of their time on themselves. This women's propensity makes them better for networking, community building and cooperation with others for sustainability issues (Learned, 2011). Furthermore, according to Johnsson-Latham (2007), women with good environmental knowledge make better environmental decisions than men. Also, the OECD (2008) argues that as women are the principal carers and educators of futures

generation, they play a crucial role in modifying and encouraging the adoption of greener behaviour and attitudes by given 'green' education to their children which lead to improve sustainment development (Casimir and Dutilh, 2003).

2. The gender difference and empathy toward sustainability

According to Martine (1997), women's full contribution is essential for achieving sustainable development (based on women traditional role as suppliers of daily consumption resources). Indeed, women are intrinsically better resource managers than men, as they have a privileged relation with nature (which referred to the eco-feminism views). On the other hand, men are considered as having 'patriarchal' attitude to the environment subjugated by exploitation of resources and profit-driven attitudes (Martine, 1997). According to Learned (2011), it appears that women are more receptive to environmentalism and it is not for necessarily for eco-friendly reason but due motherhood (i.e. well-being and safety of their families) – and such women attitude have positive implications for sustainability. Moreover, the OECD (2008:74) notes that women have greater disbelief than men regarding solution advocating for technological advancement as answer to environmental problems. Learned (2011) argues that women have higher levels of altruism, empathy and personal responsibility with regard to ecology management. Likewise, Coyle (2005), OECD (2008) and the Commission on the Status of Women (2011) found that women are keener to advocate and campaign for better labelling, bans on non-sustainable products (including production with social impacts). Also, the OECD (2008) states that women tend to be easily inclined to recycle and buy organic-eco-socially-labelled products and goods (i.e. fair trade label). Furthermore, they make more ethical

consumer choices, pay attention to issues such as child labour, sustainable goods, and place a higher value on energy-efficient transport. Finally, OECD (2008) asserts that women are keener to support governmental intervention aimed at promoting sustainable consumption behaviour in the marketplace.

Johnsson-Latham (2007) argues that there is a gender difference in term of consumption of natural resources between men and women. He argues that men's life styles and consumption patterns (rich or poor) have a propensity to be more natural resource intensive and less sustainable than women's. The OECD (2008) confirms Johnsson-Latham (2007) view by stating that women leave smaller ecological footprint than men due to their sustainable consumption patterns in term of resource impacts. Moreover, when analysing the relationship between gender and the pollution 'footprint' of males and females, Johnsson-Latham (2007) argues that on average, men pollute more than their counterpart as women tend to travel less than men (measure in person kilometres per car, plane, boat and motorcycle).

2.3.2.2.1 Critiques of the Gender Conception

Martine (1997) expressed her doubts with the eco-feminists views. She considers that linking women to nature creates a 'spiritual link' and spirituality is not necessarily a woman's privilege as it is a cultural construction. Moreover, she points out that several studies aimed at identifying a possible relationship between women, the population and the environment have found that with their reproductive role, women are directly responsible of inhabitants growth (recognized by all scientists and academics as a key factor in environmental depletion); thus, they are indirectly responsible for deteriorating

environment and not the contrary (Johnsson-Latham, 2007; Agostino, 2010; Learned, 2011). Besides, Martine (1997) argues that there is nothing intrinsic to women's nature or biology that would make them better at managing natural resources than men. Moreover, Lizuka (2000) argues that gender-sustainability relationship must be taken with caution as other studies are showing that men are more environmentally aware than women. For instance, Coyle (2005) states that a NEETF/Roper Nationwide study carried out in 2001 in the USA found out that men outperformed women in environmental knowledge test. Finally, Casimir and Dutilh (2003) argue that most studies on gender influences on sustainability are based on poor or developing countries' experiences and cannot be considered as universal.

2.3.2.3 The Environmental Education Conception

According to Coyle (2005), many individuals do not always know what to do to promote good environmental practices. Furthermore, he argues that people often believe that their small individual sacrifices for environmental improvement will not result in significant improvement given the responses of public institutions and organisations to environmental concerns. He adds that this "attitude shows a lack of environmental knowledge" (Coyle, 2005:33). Environmental education has been widely used in the environmental management literature (Orr, 1992; Aminrad *et al.*, 2010; Gadenne *et al.*, 2009; Loubster *et al.*, 2001). Orr (1992:1) estimates that "the skills that were required to industrialize the planet are not necessarily the same as those that will be needed to heal the planet". Loubster *et al.* (2001) and Tilikidou (2001) argue that environmental education is unavoidable as it gives the competence to distinguish and analyse the environmental physical condition and take

suitable steps to restore or improve the ecosystem situation. Moreover, Agostino (2010) states that to acquire the essential skills, education must play a central role in the context of sustainable development as lifelong learning can alter popular attitudes. According to Cole (2007: 37), environmental education is the "fostering of an awareness of environmental issues and problems, developing the skills to solve those problems, and inspiring a willingness to make effective decisions as action-oriented citizens".

2.3.2.3.1 Principles of Environmental Education

Roth (1992:18) argues that an environmentally educated individual should be familiar with four concepts: Knowledge, effect, skills and behaviour (see Table 2.4 below). Whereas Van Liere and Dunlap (1978, 1981) state that education is positively related to environmental knowledge; as such, the University of Georgia (UGA) which is one of the first universities in the USA requiring from all its undergraduates to complete an environmental education module (Moody *et al.*, 2005), states that an environmentally literate individual should be familiar with six concepts (see Table 2.4). Furthermore, Loubster *et al.* (2001) propose ten concepts (listed in Table 2.4) which they believe any environmentally literate individual should have. Moreover, Coyles (2005) asserts that a true ecological education encourages greater understanding of the environment, and pushes for the ability to proficiently apply that understanding.

Furthermore, Bunnin and Tsui-James (2003) and Cochrane (2006) argue for the inclusion in any environmental education program of the conception of environmental ethics. Indeed, they argue that environmental ethic leads to

standards regarding behaviours and/or conduct toward the environment and these standards help to distinguish between "right" and "wrong" behaviours. It is therefore deeply related to the conception of environmental education (Loubster *et al.*, 2001; Cochrane, 2006). As a result, it emerges that any efficient environmental management must include environmental knowledge and ethics programmes at schools and universities. Nevertheless, as Cole (2007:40) emphasizes, such proficient environmental education programs, will require "a political act".

2.3.2.3.2 Critiques of Environmental Education

The objectives of environmental education have been continuously contested. This study has identified eight foremost criticisms. First, Gruenewald (2004) states that the conception's opponents are disturbed about the 'politization' of the concept which, they argue; it reduces the prospects for developing empathy and willingness amongst people regarding the natural world.

Second, the perspective is labelled as having a focal point on individual skills and outcomes (Gruenewald, 2004) instead of proposing global strategies for the resolution of environmental problems. Critics argue that the environment is a global issue, and focusing on individual skills as a solution cannot resolve the ecological problems.

Third, Coyle (2005) expresses his reservation with the notion of 'raising the knowledge' of the populace as he argues it has real limitations. He claims that increased environmental knowledge is efficient when it comes to simple and easy individual's behaviours such as reducing water spillage or energy saving

but for major environmental issues, the increase in the population's knowledge has no incidence on the problem.

Forth, Coyle (2005:19) criticises the fact that environmental advocates (whether institutions or organisations) have no patience or interest in formal pedagogical approach and often use the media as their primary mean of public communication. He argues that media institutions do not supply education. They are a powerful form of ecological information, and they only help accentuate one of the main problems of environmental education, which is the environmental myth.

Fifth, Sanera (2008) claims that environmental education edifies ecological myths. For example, Sanera (2008:3) asserts that environmentalists have created ecological myths such as "Recycling is always good," "Pesticides are always bad" and "There are too many people", with the objective of encouraging citizens to recycle not without considering potential costs.

Sixth, Cole (2007:37) argues that the perspective is excessively "confined to science-based content and decision making...although it should include multidisciplinary methodologies" (socio-political-cultural concepts).

Seventh, Cole (2007:40) stresses that "the white, western values and ideologies dominate the discourse of environmental education". She perceives it as an inherent threat to the perspective and advocates for it to be de-constructed to include other cultures.

Eighth, one of the frequent critic, of the concept is that environmental education is alarmist and anti-business (Smith, 2000) as well as a form of indoctrination (Gruenewald, 2004), and has been "emotional, unscientific, and biased" (McCrea, 2006:4). For illustration, Sanera (2008: 4) considers that the perspective begins with an assumption that the "environment is in grave danger and must be saved". Sanera (2008) also asserts that environmental experts are the ones largely responsible for establishing current environmental education programs. Consequently, he concludes that ecological students are bound to receive partial and misleading information.

In summary, most critiques seem not to reject the idea of improving the education of people regarding the environment. But they seem directed at environmental issues claims such as the extent of global warming or the extent to which recycling can benefit the environment. Thus, with nearly seven billion people living in our planet, advocating for small changes in behaviour which can positively impact on the planet is supported by all. Education becomes central in such prospect as "an environmental literate person is significantly more likely to engage in a set of pro-environment activities than someone who is not educated on the environment" (Coyle, 2005:43).

Therefore, based on the above review of literature on environmental education, the following hypothesis needs to be tested: ***$H_2$1: An environmentally knowledgeable individual will take pro-active environmental actions.***

Table 2.4 List of Elements an Environmentally Literate Individual Should Have

Roth (1992) four core elements of environmental education	Environmental Education Committee (2003:2-3)	Loubster *et al.* (2001) ten concepts to environmental education
1. Knowledge and Understanding of the basic components of the ecology and ecosystems: an environmentally educated individual is required to have a basic knowledge and understanding of the ecology	1. Understand basic principles governing natural environment systems, the limits and foremost issues connected with the planet's capacity to sustain life	1. Basic understanding of the biosphere and knowledge of nature, its law and man-made environment also presented by Escobar (1998) under the concept of biodiversity
		2. Understanding of an ecological concepts and principles
		3. Understanding of renewable and non renewable resources
2. Sensitivity and empathy for the nature and the society: the individual should have the capacity to ascertain the environmental changes brought by human and have empathy for the environment	2. Capacity to ascertain the consequences of mankind activities natural systems (at local, regional, and global levels)	4. Knowledge of environmental change brought by mankind
		5. Knowledge of how to maintain environmental quality and quality of life
3. Ability and skills to identify and define problems: the individual should be able to identify environmental problems, and establish its impact on the quality of life. Dunlap (1994) also elaborates on the idea when presenting his conceptual model on attitudes and perception towards the environment.	3. Ability to establish the impacts of changes within environment natural systems of human's life, health, and welfare	6. Understanding of the human activities and how it affects health, the environment and the quality of life - And understanding of action to be taken to correct such imbalance
	4. Ability to determine the connections between all living things and their dependence on each other as well as the physical environment	7. Awareness of human interactions with the environment and interrelationships in an ecosystem
	5. Aptitude to establish the economical, political and cultural, forces (past and present) influencing attitudes and decision making toward the environment	8. Knowledge of the decision-making process on environmental issue in scientific, economic, legal, social, and political contexts
4. Activities, behaviour aiming at maintaining or improving the quality of the environment: the individual should have the willingness and the ability to apply environmental ethic as a way of life.	6. Skills to establish the influence of ethic and morals principles in an individual and/or group decision-making regarding the environment	9. Knowledge of environmental ethics as a way of life
		10. Willingness to curtail individual privileges

Source: Adapted from(1) Loubser, C. P., Swanepoel, C. H., Chacko, C. P. C. (2001), Concept formulation for environmental education, *South African Journal of Education*, Vol.21, Issue No. 4, pp.317-323; and (2) Roth, C. E. (1992), Environmental Education: Its roots, evolution and directions in the 1990s. *Ohio State University.*

2.3.3 The Economic Approach to Sustainability

Munasinghe (2004: 1) states that the objective of the economic view of sustainability is to "make development more sustainable". Its objective is to achieve optimal and proficient economic results applied to a sustainable use of the earth's scarce natural resources. In the context of the United Kingdom economy, following the Kyoto agreement requiring the reduction of greenhouse emissions gases, The UK government enacted legislation requiring a 36% reductions of green house gases by 2020 while the the Scottist government has passed regulation mandating a 42% reduction of green house gases by 2020 (Bebbington and Barter, 2011). If these targets are to be achieved, they necessitate considerable responses from major actors of the economy: institutions and organisations. Under this approach, economic concepts such as: Environmental Impact Assessment (Mahayri, 1999; UNEP, 2002; Zhao, 2009); Corporate Social Reporting also referred to as Sustainable Development Reporting (Elkington, 2004; Brown *et al.*, 2007; The Economist, 2008; Bebbington et al, 2008; Bebbington and Frame, 2009; and Renewable Energy (Dincer, 2000; Bull, 2001; Buschert and Bitzer, 2009) are discussed under this section

2.3.3.1 The Environmental Impact Assessment (EIA)

According to Litrico (2011), ecological concerns are often at the centre of disagreements between various stakeholders (NGOs, communities, local authorities) in many nations. As a result, intense activity of conceptual elaboration by scholars and organisations (Hughes, 1998; IAIA, 1999; UNEP,

2002; Zhao, 2009) took place in the 1960s, giving birth to the Environmental Impact Assessment (EIA) conception as a component of a rational decision making process. EIA is a procedure that must be followed in certain type of projects which aim at identifying and providing an assessment of actual and potential impact (positive or negative) on the environment (i.e. ecosystem, fauna), social and economic aspects of a community (Mahayri, 1999; UK Department for Communities and Local Government, 2006). The EIA defines Environmental Impact Assessment as "a systematic and integrative process that evaluates the potential impacts of a major project significantly affecting the environment. It is seen as an instrument with the central and ultimate role in achieving sustainable development" (Zhao, 2009: 485). Having defined the concept, the next part focuses on the principles of EIA.

2.3.3.1.2 Components of EIA

The core idea of EIA is that a development activity in a specific area can positively as well as negatively affect the quality of life in other sectors or ecosystems (OAS, 1987). The concept is used in many countries, and its processes and implementation can differ between countries (Mahayri, 1999). However, there are several common components such as the inclusion of technical assessment (helpful for objective decision making according to Senecal *et al.*, 1999). These components are listed on Table 2.5 below. The Table represents the ten recurrent requirement of EIA and is derived from various sources (Senecal *et al.*, 1999; Mahayri, 1999; UNEP, 2002; UK Department for Communities and Local Government, 2006; UN general assembly, 2011). An effective environmental impact assessment involves: (i)

screening every project and holding preliminary consultation with the stakeholders; (ii) scaling each project; (iii) examining whether alternatives to the project exist; (iv) identifying and classifying all the impacts (economical, social, environmental); (v) examining impact management and mitigation; (vi) examining whether such impacts are acceptable; (vii) elaborating an impact assessment statement, (viii)reviewing the assessment; (ix) decision making (the project is to be accepted or rejected based on the previous stages); and (x) monitoring all accepted projects. A key feature of EIA is the participation of the public (see Table 2.5). Indeed, "an EIA cannot achieve its goal of evaluating the environment impact of a project fully without first obtaining the views of people most likely to be affected by the proposed project" (Zhao, 2009:498). Besides, public involvement has a tendency to improve a development design, its environmental reliability and social tolerability (Hughes, 1998), with decision makers (i.e. local government, national government) and other stakeholders (i.e. local communities, NGOs) either accepting or rejecting a project based on information generated from the EIA (Hughes, 1998; Litrico, 2011).

As stated above, if all EIA elements are respected, the environmental management objectives will be achieved (Senecal *et al.*, 1999). However, the perspective of EIA has many criticisms that are presented below.

Table 2.5 Core Components of an EIA

1. *Screening of the project and preliminary consultations*	EIA should be apply as early as possible in decision making and throughout the life cycle of the proposed activity (Mahayri, 1999)
2. Scaling the project including the identification of stakeholders and of the actual state of the environment	Environmental considerations should unequivocally be addressed and incorporated as it will help for the decision making process (Senecal *et al.*, 1999; UNEP, 2002)
3. Identifying alternatives	Promoting sustainable development and resource optimization and management is essential (Mahayri, 1999; Senecal *et al.*, 1999)
4. Identifying environmental, social and other related impacts of the project	Natural systems and the ecological processes productivity and capacity should be protected (UN general assembly, 2011; Senecal *et al.*, 1999)
5. Impact management and mitigation	
6. Evaluation of consequences; are the impacts tolerable?	Predicting and circumventing, diminishing or offsetting the adverse or biophysical impacts and relevant socio-economic factors of the project is essential (UN, 2011; Senecal *et al.*, 1999)
7. Preparation of an Environmental Impact Statement (EIS) report	The report should included proposals, management options and element cited upper (Senecal *et al.*, 1999).
8. Review of EIS	EIS should be open to public observation for an acceptable period of time(UK Department for Communities and Local Government, 2006; UN general assembly, 2011)
9. Decision making. If rejected, the project's promoter can appeal	Public observations should be considered and a decision should be made (either accepting the project or rejecting it) in accordance with internationally settled processes (Senecal *et al.*, 1999; UK Department for Communities and Local Government, 2006, Litrico, 2011)
10. Monitoring and reviewing the project	An implementation plan should be prepared (UK Department for Communities and Local Government, 2006)

Sources: Adapted from readings from UN general assembly (2011), UK Department for Communities and Local Government (2006), UNEP (2002), Senecal *et al.* (1999) and Mahayri (1999)

2.3.3.1.3 Critiques of EIA

Although EIA is advocated by many scientists and academics, there is a growing dissent of the perspective such as the poor involvement of public during consultations (Zhao, 2009; Mahayri, 1999; Hughes, 1998). Indeed, many countries such as China (Zhao, 2009), Syria (Mahayri, 1999) do not hold proper public consultation regarding EIA projects. A further issue is that the inadequate financial and administrative resources in many countries making it impossible and idealistic for stakeholders to assess every project's impacts under any EIA regime (Hughes, 1998; Zhao, 2009). Moreover, Hughes (1998) raises concern regarding the excessive use of technical jargon

or "mystification techniques" (Hughes, 1998:7) by EIA reports which can make the results inaccessible to some stakeholder groups (i.e. locals, decision makers).

Hughes (1998) disapproves of the power imbalance between authorities in a country as national ministries sometimes overturn local authorities' decisions. He adds that such action by ministries can lead to conflict between levels of government, or between government agencies, which can negatively affect the outcome of EIA. Concurring with Hughes' view (1998), Mahayri (1999) and Zhao (2009) also criticise the excessive power of local authorities with regard to EIA approval and argue that this can lead to authorities approving projects with disastrous outcomes for the environment without considering refusals from communities or EIA recommendations. Mahayri (1999) and Zhao (2009) also criticise the fact that EIA is treated as a separate process and not integrated into the project life cycle. They believe that the non-inclusion of EIA into project life cycle could lead to: (i) weak implementation and enforcement of requirement; (ii) lack of monitoring; (iii) inconsistent application; and (iv) 'reduce' compliance supervision and review of the terms set out in reports.

Johnston and Santillo (2007), assert that omissions and shortcomings (i.e. poor quality of supposedly comprehensive environmental information) in the analysis of impacts assessment are frequent, thus leading to ill-advised decisions. Their analysis is supported by Zhao (2009) who indicates that many EIA reports are poorly written with information not understated or sometimes voluntarily omitted. Zhao (2009) points out that EIA's documentations in many

situations are prepared by private organisations competing between each other for securing and preserving clients. On that basis, he asserts that many of these institutions tend to accommodate projects owners'/developers' demands instead of carrying out objective assessment of EIA.

The critiques above do not seek to generate a lack of confidence in the EIA concept by the general public including decision makers, however they are intended to complete the conception (Johnston and Santillo, 2007; Zhao, 2009). Thus, these constructive criticisms, if taken into consideration can help to achieve optimal EIA. As Hughes (1998) asserts all of the stakeholder(s) contribution to EIA process is paramount as it tends to improve the quality of EIA reports.

2.3.3.2 Sustainability Reporting (SR)

Sustainability reporting was first coined by John Elkington (2004) and consists of three Ps: profit, people and planet (The Economist, 2009). Elkington's (2004) plan was to obtain full accountability from organisations. To do so, he argued that the production by organisations of complete environmental and social statements along with their financial statements was required (Gray and Milne, 2002; The Economist, 2009). SR helps organisations achieve better environmental performance through appraising, monitoring and reporting their environmental impact. Thus, generating positive impact on the society and the economy (Brown *et al.*, 2007). Sustainability Reporting is defined as an approach which "broaden organisations accountability beyond simply ensuring financial performance for shareholders, to demonstrating 'triple bottom line'

performance for stakeholders" (Africa, 2002:79). SR is "the practice of expanding traditional business reporting to include elements of organisation's economic achievements as well as environmental and social performances" (Choudhuri and Chakraborty, 2009:48). The conception is largely controversial. Indeed, several authors (Gray and Milne, 2002; Unerman *et al.* 2011) call for the regulation of the reporting to set things right. Whereas, others (Brown *et al.*, 2007; Choudhuri and Chakraborty, 2009) claim that its success is due to its voluntary aspect.

Reporting on sustainability performance is regarded as an essential approach for organisations to better manage their impact on sustainable development (Ballou *et al.*, 2006; Bebbington et al, 2008; Bebbington and Frame, 2009). Indeed, SR can lead to improved sustainability outcomes as it allows organisations to measure, track, and improve their performance on specific issues (Bebbington and Frame, 2009; Choudhuri and Chakraborty, 2009). Numerous organisations now produce annual sustainability reports and referred to it under different headings such as (i) the 'triple bottom line' (Elkington, 2004); and (ii) the corporate social responsibility (Bebbington et al, 2008; Choudhuri and Chakraborty, 2009). In an attempt to harmonise environmental reporting standards for all organisations of any size or country, the Global Reporting Initiative (based in Amsterdam) was proposed and has grown to become the most widely used and standardized reporting framework for environmental issues since it released its first guidelines in June 2000 (Kolk, 2005).

2.3.3.2.1 The Global Reporting Initiative (GRI)

The Global Reporting Initiative works closely with the United Nations (Ballou *et al.*, 2006) and seeks to enable all worldwide organisations to assess their ecological performance and divulge the results in a similar way as financial reporting. Choudhuri and Chakraborty (2009) state that organisations' sustainability must include three fundamental aspects: economic, environment, and society (see Table 2.6 below).

Table 2.6 - GRI Sustainability Reporting Guidelines

Economy	1. Cost of all goods, materials, and services purchased 2. Total payroll and benefits (including wages, pensions, other benefits, and redundancy payments) broken down by country or region.
Environment	1. Percentage of materials used that are wastes (processed and unprocessed) from sources external to the reporting organisation 2. Direct energy usage segmented by primary source 3. Greenhouse gas emissions
Society	1. Net employment creation and average turnover segmented by region/country 2. Standard injury, lost day, and absentee rates and number of work-related fatalities (including subcontracted workers) 3. Evidence of consideration of human right impacts as part of investment and procurement decisions, including selection of suppliers/contractors 4. Description of policies, guidelines, and procedures to address the need of indigenous people 5. Number of substantiated complaints regarding breaches of consumer privacy

Source: Hawke, Lewis. (2004:49), Walking the talk on sustainable development in the public sector, *Global Reporting Initiative portal* (in Choudhuri and Chakraborty, 2009)

With the advent of the GRI guidelines, the number of organisations adopting its standards has increased significantly. Indeed, in October 2006, there were more than 1000 international companies registered with the GRI that regularly issue their sustainability reports (Ballou *et al.*, 2006). Although many international organisations are now reporting, the vast majority of worldwide organisations are not (Gray and Milne, 2002; Unerman *et al.*, 2011). Kolk

(2005:38) gathered information regarding the reasons why some organisations are reporting and some are not (see Table 2.7 below). Moreover, Kolk found that in addition to regulations and related incentives, organisations have a wide array of other reasons for adoption (or not) the GRI conceptual guidelines, including reasons such as credibility, the fear of external stakeholders actions such as NGOs and more.

Table 2.7 - Organisations Motivations for Producing (or Not) GRI Reports

Reasons for reporting	Reasons for not reporting
• Enhanced ability to track progress against specific targets • Facilitating the implementation of the environmental strategy • Greater awareness of broad environmental issues throughout the organisation • Ability to clearly convey the corporate message internally and externally • Improved all-round credibility from greater transparency • Ability to communicate efforts and standards • License to operate and campaign • Reputational benefits, cost savings identification, increased efficiency, enhance business development opportunities and enhanced staff morale	• Doubt about the advantage it would bring to the organisation • Competitors are neither publishing reports • Customers (and the general public) are not interested in it, it will not increase sales • The company already has a good reputation for its environmental performance • There are many other ways of communicating about environmental issues • It is too expensive • It is difficult to gather consistent data from all operations and to select correct indicators • It could damage the reputation of the company, have legal implications or wake up 'sleeping dogs' (such as environmental organisations)

Source: Kolk, Ans. (2005:38), Sustainability reporting, *VBA Journal*, Vol.3.

Brown *et al.* (2007:1) state that GRI is remarkably successful, especially when considering the "productivity, creativity, visibility, engagement of leading organisations and internationally influential individuals, and ability to attract funding". Bebbington and Barter (2011:7) conclude that the "regulatory environment whitin which organisations operate will continue to evolve in this area ... and that organisations which have taken a strategic and long term goal approach to sustainability reporting will be well place to ride out that trend"

2.3.3.2.2 Critiques of sustainability reporting

Gray and Milne (2002:6) argue that the planet faces a real danger because all stakeholders "talk a lot about sustainability reporting which nobody is doing, can do or want to do – sustainability reporting". Their view is shared by Ballou *et al.* (2006) and Unerman *et al.* (2011) who all express their doubts regarding the existence of such concept. Moreover, Gray and Milne (2002:5) assert that previous studies suggest that organisations are more likely to generate un-sustainability than "to contribute to sustainability". In fact, they argue that most organisations' aims is to achieve growth and profit, consequently, their environmental footprint can only increase. This explains why full environmental reports meeting all the GRI guidelines are "still exceptionally scarce" (Gray and Milne, 2002:3) while, most organisations reports on files remain "fairly superficial" (Africa, 2002:81). Also, Choudhuri and Chakraborty (2009:53) who are fervent defenders of SR recognise that there are barely any organisations that can "monitor, restrict and regulate their sustainability reporting process... will it be national, regional or global". Gray and Milne (2002: 4) and Unerman *et al.* (2011) criticise the 'voluntary basis' of the conception which they consider as "an empty rhetoric". They argue that legislation is the only conceivable mean for obtaining completed sustainable reports from organisations. Also, the process of execution of environmental reporting is condemned as it requires different types of expertise (financial, social, and environmental), making it difficult to achieve as it brings audit issues (Choudhuri and Chakraborty, 2009).

2.3.3.3 The Renewable Energy

Renewable energy, also referred to as 'alternative energy' (Dincer, 2000) or 'new energy' (Calasanz, 2005) is an expression regrouping all usable energy sources which are expected to substitute nations' conventional energy sources (i.e. fuel, wood, coal) as their production does not generate the undesired consequences (e.g. CO_2 production, ozone depletion, heath issues) which are frequently associated with sources such as coal, wood and fuels. For instance, energy supply and use are related to the following problems: air pollution, global warming, acid rain, destruction, radioactive emission and ozone depletion (Dincer, 2000). In fact, the German Government (2010) considers that energy consumption in Germany accounts for 80% of all Germany's greenhouse gas emission. Therefore, the use of a reliable, ecological and economically viable energy supply is one of the great challenges of the planet's nations with regards to the UN climate changes objectives (Buschert and Bitzer, 2009; German Government, 2010). A key element of renewable energy is 'new technologies' (Bull, 2001). Indeed, "energy is the convertible currency of technology" (Dincer, 2000:157). Moreover, according to Bull (2001), alternative energy has a major advantage compared to actual energy sources: it is abundant and is available worldwide. Indeed, Bull (2001:1216) states that "1000 times more energy reaches the surface of the earth from the sun than is released today by all fossil fuels consumed". Another benefit of alternative energy is the fact that by replacing actual energy supplies, it helps reduce pollution. Indeed, the US Energy Information Administration (2009) states that renewable energy now provided 10.45% of the US total energy consumption which Bull (2001) estimates it

represents 70 million metric tons of carbon emissions not released into the atmosphere.

Renewable energy is "the energy that would have been wasted away, but is now collected and used to do work or stored in an appropriate manner ...it is also energy which a manufacturing process would ordinarily waste into the atmosphere, but which we have succeeded in recovering in order to produce more work". Calasanz (2005:1). Qualk (2010: 22) defines renewable energy as a "conventional hydroelectric power, geothermal, solar/PV, wind, and biomass".

According to Dincer (2000), sustainable development requires a sustainable supply of energy resources and an effective and efficient usage of energy resources. In this regard, Dincer (2000) considers that renewable energy resources are the most efficient and effective solution for ecological problems, and as with fossil fuels, alternative energy resources are distributed inequitably throughout the world and produce very little if any waste or pollutant (Bull, 2001). Whereas Buschert and Bitzer (2009) consider energy source as 'carbon neutral'. Dincer (2000) argues that an intimate connection exists between renewable energy and sustainable development because of three main reasons: (i) their environmental impact is almost nil compared to other energy sources; (ii) they are unlimited unlike fossil fuel; and (iii) they encourage locally applied energy solutions.

2.3.3.3.1 Sources of renewable energy

Renewable energy is generated from natural resources such as sunlight, rain, tides, wind, and geothermal heat which are naturally replenished. Below are detailed types of energy currently 'harvested' around the globe:

Photovoltaic energy

Photovoltaic energy uses the sunlight and converts it into electricity using technological devices (Dincer, 2000). Two types of photovoltaic energy exist: thermal and electricity energy. Moreover, various type of technological devices exist: Solar photovoltaic using light to generate energy (Bull, 2001), and thermo-photovoltaic, using the energy of heat or infrared radiation to generate electricity (Narayanaswamy and Chen, 2003). Bull (2001) explains that the devices consist of exceptionally modular devices which require little maintenance, and which have an average lifetime of 20 years.

Wind energy

Wind energy is the process of generating electricity from the wind. According to Bull (2001), in 2000, there were over 3900 MW of additional wind energy facilities installed worldwide (representing a $3.9 billion worth of sales revenue). As an example, Bull (2001:1218), points out that North Dakota, a US state with major wind potential could supply alone 36% of all the electricity consumed by 48 of the US states if it is harvested.

Bio power

Bio power is the process of using biomass resources to generate electricity (Dincer, 2000). According to McVeigh *et al.* (2000), it can be regrouped into

three clusters: municipal solid waste, wood and agricultural waste, and biomass grown specifically for energy content. Buschert and Bitzer (2009: 2) stress that Biomass plants produce as much carbon-dioxide than the biomass resources had absorbed during their growth (i.e. crop, forest product); therefore, the authors consider that such energy production as ecologically neutral.

Bio fuel

Bio fuels are plants-derived alternatives fuel/gasoline for powering technological devices including cars. The US Environmental Protection Agency (2011), states that using bio fuel can reduce cars' emission of carbon monoxide by 25% to 30%.

Geothermal energy

Geothermal energy is based on the use of hot water, steam, hot dry rock, magma and heat from underneath the earth to generate energy for purposes such as heating for building or electricity generation (Bull, 2001). McVeigh *et al.* (2000) state that such energy production involves collecting naturally heated vapour to drive turbines.

Hydrogen and fuel cells

"Hydrogen is the most abundant element in the universe, the simplest chemical fuel that makes a highly efficient, clean-burning energy carrier" (Bull, 2001:1220). Hydrogen is used as clean fuel for airplanes, spaceships, and vehicles. It can also supply heat for industries and domestic facilities.

Distributed power

According to Bull (2001), this approach uses technologies such as photovoltaic systems, wind turbines devices, fuel cells, biomass energy generators, electric storage systems and more to provide reliable energy service with a sufficient level of power to homes and businesses.

2.3.3.3.2 Critiques of Renewable Energy

Controversies regarding dominant sources of energy and their alternatives are recurrent in the literature. Moreover, due to the variety of energy choices, defining some energy types as 'alternative' is highly controversial. For instance, hydrogen, wind power, nuclear energy and wind turbines are surrounded by growing disputes on their safety for the environment they are supposed to protect. Indeed, Bradley Jr (1997), argues that alternative energy has generated many environmental damages such as river habitat destruction (hydro-energy), increased avian mortality (wind power), air pollution emissions (biomass) and toxic discharges (geothermal).

Two of the most recurrent criticisms of the conception are: (i) The fact that it is heavily dependent on technology (Bradley Jr, 1997; Dincer, 2000; Bull, 2001; Calasanz, 2005; German Government, 2010); and (ii) the fact that it is expensive (Bradley Jr, 1997; Bull, 2001). Bradley Jr (1997) notes that renewable energy is twice as expensive as the actual fossil fuel alternative. Whereas McVeigh *et al.* (2000) point that although major investments have been made into alternative energy generation its diffusion into the market and public has fallen far short of expectation. Consequently, alternative energy is

not economically viable but it is a social and political perspective (Savacool, 2008).

2.3.4 The Ecological Approach to Sustainability

The ecological view focuses on the protection of the nature's biodiversity and of its natural cycles. The emphasis is also on the preservation of ecosystems resilience so that it can adapt to changes made by humans. The following parts will analyse the following ecological conceptions: the natural resource, goods and services (Leach *et al.*, 1999; Campbell, 2001; Jones *et al.*, 2009), and the carrying capacity of the planet (Rees, 1996; Jeroen *et al.*, 2004; Chadenas *et al.*, 2008).

2.3.4.1 The Natural Resource, Good and Service Conception

This conception is also referred to as the Integrated Natural Resource Management - INRM (Douthwaite *et al.*, 2004) and is one of the earliest environmental concepts (Hartwick, 2002; Moberg and Folke, 1999; Leach *et al.*, 1999). It relates to the idea of exploiting the advantages of specific natural resources and to meet production goals of specific stakeholders (e.g. governments, organisations) in a sustainable and manageable way (Campbell *et al.*, 2001; Kirby and Weiser, 2011).

A new INRM's conceptual approach is advocated by numerous authors (Leach *et al.*, 1999; Warner, 2000; Ganz *et al.*, 2003; Bond *et al.*, 2006; Danida, 2007) as Community based Natural Resource Management (CBNRM). CBNRM is defined as an approach to the management of natural resources in which a government or nation can jointly-share with its local

communities the privileges and responsibilities of its natural resources (Bond *et al.*, 2006; Danida, 2007). With this conception, government institutions' role changes to acting as "mediators of community-environment relations" (Leach *et al.*, 1999:226) while the community enjoys privileges including the ability to generate economic benefits in sustainable ways for the exploitation of natural resources (Warner, 2000; Bond *et al.*, 2006). Some studies regard CBNRM as a social approach but with the focus being on resource management, it is an ecological concept with aspect of social perspectives (Bond *et al.*, 2006). Danida (2007) suggests that the concept is relying heavily on institutional capacity for law enforcement and on financial incentives for natural resource preservation among stakeholders. This implies that in poorer nations or in countries lacking financial resources, CBNRM implementation will be heavily reliant on external stakeholders (.i.e. donors) as political prioritisation in such countries will be on other matters (i.e. security, health, population education, poverty reduction) as populations in these countries require tangible solutions to their economic solutions (Jones *et al.*, 2009).

2.3.4.1.1 Critiques of the INRM

It is argued that INRM agreements are unlikely to be sustainable, unless government structures are associated to the project. For instance, Bond *et al.* (2006), argue that a major problem INRM faces is the fact that the laws and policies regulating natural resources management are obsolete in many countries. Similarly, Leach *et al.* (1999) consider that there is a propensity for the 'intended beneficiaries' to be considered as non-receptive recipients of INRM/CBNRM project activities. Furthermore, Douthwaite *et al.* (2004) description of the INRM highlights the fact that the concept was reactive and

highly dependent on technological innovation as a solution to environmental management (Warner, 2000). Leach *et al.* (1999) state that there is a lack of clear measures/standards by which to review success(es) in achieving conservation or development goals. Whereas Warner (2000) suggests that the concept has the potential to create struggles/conflicts (.i.e. disputes over land and resource ownership, between indigenous and resource users, lack of cooperation between different community groups) within communities.

2.3.4.2 The Carrying Capacity of the Planet Conception

The conception of carrying capacity is "the maximum number of a species that can be supported indefinitely by a particular habitat, allowing for seasonal and random changes, without degradation of the environment and without diminishing carrying capacity" (Hardin, 1977:1). An environment's carrying capacity refers to "the maximum quantity of permanent or seasonal activities and users the territorial resources system can bear without imperilling its specificities" (Chadenas *et al.*, 2008:29).

The conception of carrying capacity derived from the biological sciences (Hildyard *et al.*, 1993) and argues that there is a limit to the growth of any biological population (Liu, 2003). Carrying capacity applies to the planet's fauna and plants, including humans (Hardin, 1977). It is a versatile perspective and is widely applied to various human-environment interactions (Sayre, 2007). For instance, with livestock management systems, it is synonymous to 'grazing capacity' (Scarnecchia, 1990); while in tourism it refers to the maximum number of visitors/guests which an area could sustain without damages (Liu, 2003).

The carrying capacity of a biological species in an ecosystem refers to the limit in terms of the species' population size that the ecosystem can sustain without irreversible damages including the preservation of fundamental supplies (i.e. water, food) available in that environment (Hardin, 1977; Rees, 1996; Chadenas *et al.*, 2008). Referring to the earth's carrying capacity is thus attempting to answer the following question: what is the limit in term of organisms (including people) that an ecosystem (or the planet) can accommodate over a period of time with no irreversible damage? (Farrell and Marion, 2002). Estimating the carrying capacity of the planet is difficult (Gretchen and Ehrlich, 1992; Meyer and Ausubel, 1999) and it varies from an author to another. For instance, Meadows *et al.* (2004) argue that human population of 6.3 billion in 2003 is already exceeding the planet's carrying capacity limits; while Jeroen *et al.* (2004) estimate that the planet's carrying capacity is around 7.7 billion. Overshoot (1994: 1) propose a calculation model for human impact on the planet, which is function of its population and the population's per capita impact:

(Total human impact on the ecosphere) = (population) x (Per capita impact)

The per capita impact is also referred to as the ecological footprint (Palmer, 2000). The ecological footprint "*measures the amount of biologically productive land and sea area an individual, a region, all of humanity, or a human activity requires to produce the resources it consumes and absorb the carbon dioxide emissions, and compares this measurement to how much land and sea area is available*" Global Footprint Network (2011: 1).

The ecological footprint is based on the conception that every human on the planet requires a limited area of the planet's surface to sustain his/her existence. Thus, for example, an individual who eats rice will consume a measureable quantity of rice in a course of a year; consequently there will be an exclusive area (somewhere in the planet) dedicated to this person's rice consumption. Such an individual consumes a variety of other products (including food): packaged products, printed paper, wood furniture, fruits, vegetables, sea-food and more in a course of the same year. It is therefore possible to measure the yearly footprint of such individual (Palmer, 2000). With the conception depending on the availability of resources, Arrow *et al.* (1995: 520) argue that the planet's carrying capacity is not fixed nor static given that resources consumption are affected by new technologies (Meyer and Ausubel, 1999). Arrow *et al.* (1995) also suggest that the carrying capacity of the planet varies according on the earth's diverse species (i.e. human, elephants, giraffes, and more). Rees (1996), adding that a variety of factors (cited by Chadenas *et al.* (2008) as: water supply, food availability and accessibility, habitat) as well as improved technology and trade - can alter the carrying capacity of a given environment.

Finally, Overshoot (1994) and Palmer (2000) argue that this perspective is closely related to the concept of sustainable development as both approaches focus on achieving better ecosystem management as well as human development. Moreover, Arrow *et al.* (1995:521) and Brown (1998) argue that achieving carrying capacity requires legislation/regulation.

2.3.4.2.1 Critiques of the Carrying Capacity Conception

Hildyard *et al.* (1993) assert that the perspective of carrying capacity has two major flaws. Firstly, the approach ignores the influence of culture which has an effect on people's needs and lifestyle. Secondly, an area's carrying capacity is largely influenced by factors/events beyond the area borders (i.e. global commodity price fluctuations, greenhouse gas emission, upstream deforestation, acid rain, and so forth). Moreover, Hildyard *et al.* (1993) argue that the planet's carrying capacity is imprecise, technically implausible and unable to be defined objectively. Besides, one of the recurrent criticisms of the conception is perhaps its subjectivity (Lindberg and McCool, 1998; Brown, 1998; Farrell and Marion, 2002). Indeed, Lindberg and McCool (1998) stress that very often, the evidence presented when researching carrying capacity of a given ecosystem or area is subjective. Furthermore, the UN (2000) highlights that the concept can be misleading as sometimes it is misused by some protected areas, giving the impression that these areas are well managed and protected while it is the contrary. Furthermore, Farrell and Marion (2002:38) argue that carrying capacity limits are difficult to defend and are often exceeded due to a variety of reasons (i.e. economic pressure, political). As examples, the authors cited the Costa Rican's several parks and the Galapagos Islands where limits to visitors are often exceeded. Farrell and Marion (2002) also criticise the lack of public involvement when designing or implementing this conception. Moreover, they consider that the conception draws attention away from the wide range of environmental management strategies available for resolving sustainable development issues.

2.4 THE CONCEPTION OF ENVIRONMENTAL AWARENESS

The concept of environmental awareness, known as individual and/or organisational awareness of environmental management has blossomed as a result of a myriad of publications (e.g. Hsu, 2011; Cetin and Nisanci, 2010; Gadenne *et al.* 2009; Abdul-Wahab, 2008; Anderson *et al.*, 2007; Önder, 2006; Perron *et al.*, 2006; Rodriguez-Ibeas, 2006; Hirazawa and Yakita, 2004; Del Bri´o and Junquera, 2001; Preston *et al.*, 2000). According to Inglis (1993), environmental awareness represents skills and knowledge acquired by humans over decades of direct contact with the environment. Capra (1982: 41) states that it "only arises when, combining human rational knowledge with an intuition for the nonlinear nature of our environment". According to Kihlstrom (1996), there are two types of awareness: (i) conscious awareness during which, people are aware of what they are learning; and (ii) unconscious awareness during which people "learn from experience without being aware of what they have learned, or even of the fact that they have learned anything at all" (Kihlstrom, 1996: 30). Gadenne *et al.* (2009: 49) add that environmental awareness consists of two elements: (1) general awareness; and (2) environmental awareness, recognising the costs and benefits associated with ecological concerns.

The concept of awareness is shared and accepted among authors proposing others environmental management concepts such as for example, Loubster *et al.* (2001) and Swanepoel *et al.* (2002) whose aim at improving the awareness of their subjects through the concept of Environmental Education. Likewise,

Farrell and Marion (2002) consider that better environmental results could be achieved with the involvement of population with regard to not exceeding the carrying capacity of the planet, which requires the awareness of the public on the issue. Similarly, Douthwaite *et al.* (2004) propose community's participation as a mean to achieve an Integrated Natural Resource Management (INRM); and public participation requires awareness. Furthermore, all the cited authors consider awareness as a key element in achieving sustainability. This is in accordance with Madsen (1996) assertion that environmental awareness is paramount for the achievement of environmental protection and restoration.

Consequently, with the many conceptions (e.g. Environmental Education, INRM) aiming at improving environmental management by humans, awareness is an essential step in achieving such goal (Abdul-Wahab, 2008; Önder, 2006). However, Selman (1996:147) points out that there is "evidence to suggest that many people are apathetic to environmental issues and thus to personal behavioural responses because they feel it is the responsibility of those in authority". Thus, the question one might ask is "how do we change citizens' minds about the way they should behave with regard to the environment?" (Rose, 2002). As a solution, Rose (2002) calls for greater communication regarding environmental matters. However, numerous medias reports have indeed being presenting our planet as been doomed due to humanity actions on ecosystems (Durga, 2004). Although such approaches make sensational news, they did (and do) not contribute in changing people's environmental behaviour (Coyle, 2005). Coyle remarks that there is a chance that greater environmental communication just becomes environmental

information but environmental awareness requires more than information (Loubster *et al.*, 2001; Coyle, 2005). Environmental awareness is a result of a process involving the acquisition of environmental knowledge (education), the interpretation of such knowledge and pro-active action(s) aimed at preserving, restoring or improving the state of the environment (Loubster *et al.*, 2001; Mascaro and Scott, 2008; Ziadat, 2010). All the cited definitions of Environmental Awareness bring to mind three notions: (a) the idea of bringing consciousness and knowledge; (b) the ability to interpret; and (c) the capability to devise responses or solutions. All these elements are related to education (Swanepoel *et al.*, 2002; Gadenne *et al.*, 2009; Shri, 2009). Thus, a clean and healthy environment is as a result dependent on the environmental education of humans (Roy, 1992; Aminrad *et al.*, 2010).

2.4.1 Elements Affecting Environmental Awareness

Lizuka (2000: 27) presents a schematic model of environmental concerns, which unearth five essentials elements affecting the environmental awareness of an individual or a group of people. The first element is the position in social structure, institutional constraints and incentive structure, which Lizuka (2000) argues it includes elements such as culture and behaviour. Indeed, Bogdan and Biklen (1982:6) argue that culture is generally "acquired knowledge used to interpret experiences and generated behaviour". Furthermore, Laroche *et al.* (1996) conducted an investigation of French and English Canadians' environmental behaviour concluded that culture does influence people's pro-environmental behaviour. Moreover, H'Mida *et al.* (2008) investigated the

determinants of pro-environmental behaviour concluded that psychological factors as culture are important factors.

The second element is the values, which Lizuka (2000) asserts have a significant influence on the 'development' of attitude and behavioural attachments and intentions. The notion of value is determinant as it defines and characterizes societies. Moreover, De Groot and Steg (2007) note that value orientation is important as it determine people's behaviour. Furthermore, the American Environmental Value Survey (AEVS) (2006) which conducted a survey of American environmental perception found values to be a determinant element. Similarly, Gatersleben *et al.* (2008) also highlight that youth value influences environmental behaviours.

The third element is the general beliefs, which regroup elements such as worldview and general ecological theory. According to Boyd & Richerson (1985), community or society transmits culture and other general beliefs through a variety of structures to individuals. In other words, people are influenced by the community and structures that surround them. Indeed, Asmar (2009) asserts that in average, most individuals are likely to be influenced by their peers or their community views as most people are frequently surrounded by their peers and community (for example, they lived together, work or take classes together, share hobbies together, etc).

The fourth element is the specific beliefs and attitudes toward the environment. Lizuka's (2000) point is reinforced by Stern *et al.* (1999) assertion that people accept to support or to be part of an environmental

movement because they believed that what they valued is threatened, and that their actions can have a positive influence at restoring those valued experiences.

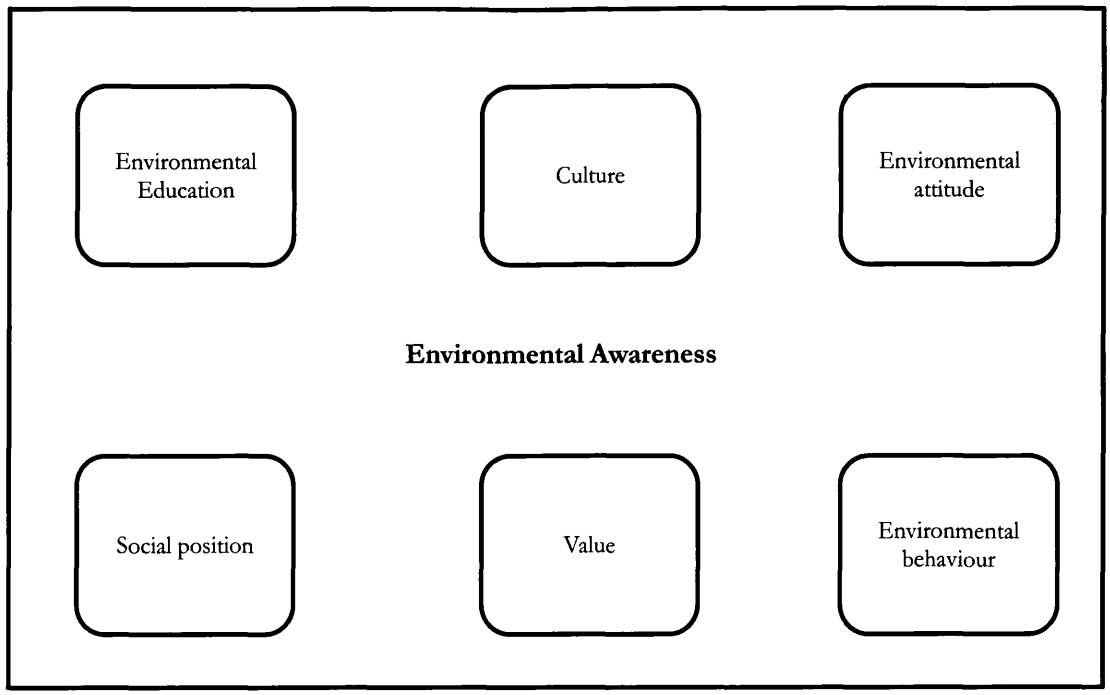
The fifth element is the behavioural commitment and intentions with regards to environmental issues which, is based on individual values and beliefs. All the above elements are essential for achieving environmental awareness (EA).

Therefore, it appears that an individual behaviour (as shown on Figure 2.2 below) is a direct result of cultural elements influences (i.e. value, beliefs, attitudes) and education influences (McCrea, 2006, 2010; Hsu, 2011). Whereas EA of an individual or group of people is shaped by a wide range of factors (see Figure 2.3 next page) which are: environmental education and knowledge; the culture; environmental attitude; the environmental behaviour; the social position; and the individual's value (Lizuka, 2000).

Figure 2.2 - Influences on Culture

Sources: Based on review of studies from Boyd & Richerson (1985); Lizuka (2001); McCrea (2006, 2010), and Hsu (2011)

Figure 2.3 Environmental Awareness Process



Sources: Based on review of studies from Altman and Chemers (1984), Inglehart (1990), Laroche *et al.* (1996); Stern *et al.* (1999), Lizuka (2001), De Groot and Steg (2007) H'Mida *et al.* (2008); Gatersleben *et al.* (2008); Asmar (2009); and Hsu (2011).

Moreover, the Council on Environmental Quality (1997) assert that public participation is indispensable for achieving sustainable development. Their view is also shared by Brodsky (2007: 5) who asserts that "greater public participations" is a critical element for achieving environmental sustainability. Bryant (2006) also concurs with the aforementioned authors and adds that public participation can influence the regulatory and government decision toward the environment. However, it must be stressed that public participation can only be achieved through education (Swanepoel *et al.*, 2002). Indeed, an environmentally educated public will become aware of environmental issues and will be further inclined to take proactive actions toward sustainability (Lizuka, 2000; Lobster *et al.*, 2001; Swanepoel *et al.*, 2002).

Based on all the above-mentioned, an individual's or group of people's environmental awareness come into view as the 'end result' (see Figure 2.3) of a process including:

- The social position of the individual/group (Lizuka, 2000),
- The education level on the issue (Marton and Booth, 1997; Loubster *et al.*, 2001; Swanepoel *et al.*, 2002; Cetin and Nisanci, 2010)
- The cultural influence (Bogdan and Biklen, 1982; Boyd and Richerson, 1985; Inglehart, 1990; Lizuka, 2000),
- The value(s) of the individual/group (Sterns *et al.*, 1995; Williams Jr, 1993; Lizuka, 2000; Gatersleben *et al.*, 2008),
- The individual's/group's attitude (Watson-Gegeo, 1988; Stern *et al.*, 1995; Ladd and Bowman, 1995; Eurobarometer, 2008),
- The individual's/group's behaviour (Boyd and Richerson, 1985; Betancourt and Lopez, 1993; Lizuka, 2000; Alcorta, 2003; Coyle, 2005; Cetin and Nisanci, 2010).

Therefore, it can be hypothesised that there is a positive correlation between EA and people position in the society. Hence the hypothesis ***$H_2$2: There is a correlation between Environmentally Aware and people's social status***.

2.5 CONCLUSION

It can be concluded from this chapter that public participation is vital element for the conception of sustainable development (Council on Environmental Quality, 1997). It is established that participation is only achievable if public environmental awareness is improved (Larijani, 2010). It is also established

that sustainable development is a long term process, and it involves a three dimensional perspective: environmental, social and economic sustainability (Ott, 2003; Adams, 2006; OECD, 2008). Next to that, many other conceptions derive from the three main sustainability perspectives of (i) social progress; (ii) economic growth; and (iii) environmental protection. The economic perspective includes approaches such as: the environmental impact assessment (Zhao, 2009; Litrico, 2011), the sustainability reporting (Choudhuri and Chakraborty, 2009; Unerman *et al.*, 2011), and the renewable energy concept (Calasanz, 2005; Qualk, 2010); the social perspective regroups concepts such as: the environmental education (Coyle, 2005; Aminrad, 2010), the gender influence (Agarwal, 2000; OECD, 2008), and the environmental justice (Brodsky, 2007; EPA, 2011); and the environmental conception comprises perspectives such as the carrying capacity of the planet (Liu, 2003; Chadenas *et al.*, 2008), the perspective of the natural resource, good and service of the planet (Douthwaite, 2004; Danida, 2007; Bond *et al.*, 2006). In the course of this part, the complexity and importance of the cited concepts as well as the perspectives' various criticisms were examined. Two hypotheses were developed from this review of literatures. They are: *$H_2$1: An environmentally knowledgeable individual will take pro-active environmental actions*, and *$H_2$2: There is a correlation between Environmentally Aware and people's social status*. The following chapter will be dedicated to empirical analysis of environmental management.

CHAPTER THREE

ENVIRONMENTAL MANAGEMENT: A THEORETICAL ANALYSIS

3.1 INTRODUCTION

As presented in chapter 2, the concept of sustainability gained global popularity with the Brundland Commission's publication, entitled "*our Common future*" (WCED, 1987). Moreover, it has been established that when discussing environmental management, reference is made to sustainable development. As such, many scholars (see Danida, 2007; Zhao, 2009; Aminrad, 2010; Qualk, 2010) provided a variety of conceptual interpretations and approaches for sustainability. Such interpretations are usually grouped under three approaches: the environmental, the social and the economic (Adams, 2006). Also, other academics such as Porter and Van Der Linde (1995), Lizuka (2000) and Delmas and Toffel (2003) have made the transition from the conceptual approach to sustainability theoretical realism. It is therefore the aim of this chapter to provide a critical review of some environmental theories. The chapter is structured as follow. Firstly, theories of environmental management are reviewed in an evolutionary basis. Secondly, factors influencing environmental management are reviewed with a focus on organisations. Moreover, sustainability drivers (at organisational level) are

examined. Thirdly, contemporary paradigms of environmental management are reviewed with a focus on environmental perception and environmental awareness. This includes analysis of organisations' stakeholders' perception of environmental problems, the influences on environmental awareness, and factors leading to environmental actions. Hypotheses are formulated in order to define the framework in which the study will be carried out. The chapter concludes with remarks on sustainability and environmental awareness.

3.2 THEORIES OF ENVIRONMENTAL MANAGEMENT

Since the industrial revolution, several theories have been applied to the problems of sustainability. Some of the theoretical frameworks focus on establishing the relation between nature and humans, while others focus on the economic relationship with nature. As such, Colby (1991) regrouped such theories into five major paradigms of the relationship between humanity and the natural environment, ranging from the industrial revolution until the very recent past. Furthermore, Blackburn (2007) states that all the environmental management theories have a common ground. Indeed, Blackburn argues that they confirm the beliefs that ecological concerns were and continue to be a source of great concern in our contemporary time. This section focuses on Colby's five environmental paradigms (presented below).

3.2.1 Ecological Economics

Ecological Economics is defined as "...a field of study that addresses the relationship between ecosystems and economic systems in the broadest

sense. These relationship are central to many humanity's current problems and to building a sustainable future but are not well covered by any existing scientific discipline" (Costanza *et al.*, 1991: 2). It is also defined by Xepapadeas (2008, in the New Palgrave Dictionary of Economics, 2012) as "the study of interactions and co-evolution in time and space of human economies and the ecosystems in which human economies are embedded".

Since the beginning of the 20th century, the fundamental argument of the relationship between economics and the environment was that pollution was an externality, an unintentional effect of market decisions (Colby, 1991; Hopwood, 2005; Stavins, 2008). Indeed, the economic definition as "the study of the allocation of limited, or scarce, resources among alternative, competing ends" (Daly and Farley, 2011: 3) confirms such assertion. As such, Stavins (2008) regards Pigou (1920) as the first to have coined the economic effects on the ecology. Indeed, Pigou was the first to suggest governmental taxation equalling the cost of pollution or ecological damages as an efficient solution to environmental problems. As a result of Pigou's perspective, Kapp (1950, in Spash, 2009) and Coase (1960, in Stavins, 2008) are portrayed as the pioneers who established the 'social and ecological cost' of the prevailing perspective of the industrial revolution era, known as "frontier economics" (Colby, 1991:195). Frontier economics advocates consider environmental damages as a 'necessary evil', meaning that in order to cope with rapid population growth and development, environmental 'collateral damage' is necessary. Moreover, such advocates argue that such damages could easily be fixed after development reaches a point where demand for environmental management will become affordable. Hence, to give importance to

environmental externalities resulting from the human-economies objectives (e.g. pollutions) is regarded as a 'no option' by the neoclassical supporters (Stavins, 2008). Indeed, followers of this paradigm have no considerations for issues such as waste management. Besides, they have an absolute faith in development, technological advancement, human creativity and its capacity to deal with any incoming economical problems (Colby, 1991). Moreover, Colby (1991:199) argues that a fundamental flaw exists under this approach: the lack of awareness of nations' economy (human's economy) dependency on the environment natural resources (physical and biological).

Most academics consider the late 1960s as the origins of the frontier economics approach (Colby, 1991; Spash, 2009). Moreover, authors such as Boulding (1966), who established the interconnection and 'embeddement' of human-economic and other behaviour, Nicholas Georgescu-Roegen (in Kozo, 2001), who formulated the bio-economics theory which regrouped economic, society and environmental approaches (Kozo and Gowdy, 1999), and Costanza (1991, 1992), who established the existence of an interface between the environment and economic systems, are regarded as the founders and contributors to the ecological economics.

The ecological economic is founded on the postulation that environmental inequities can be resolved in a sustainable manner by integrating principles of sustainable development within economic demands (Turner *et al.*, 2001; Bateman *et al.*, 2010). For instance, Thampapillai *et al.* (2007) and Xepapadeas (2008) establish the dependence of the economy on the planet's natural resources as well as the ecosystem's role on the human-economics.

The Earth's natural resources provide the jobs, the goods and services which are essential for an economic development.

Colby (1991), Kozo and Gowdy (1999) and Daly and Farley (2011) recognise the importance of "social, political, ethical and institutional factors which ecologists were not trained to detect and economists were trained to neglect" (Spash, 2009: 4). Indeed, economists (classical and neoclassical) have generally dismissed attempts to link environmental concerns with their subjects; they have generally argued that 'real economics' was all about growth, unemployment, inflation and so on (Spash, 2009). Although progress has been made, nations continue to favour economic growth versus the environment and as a result environmental degradation continuing to rise (Vitousek, 1994; Dincer, 2000; UN, 2010). Moreover, frontier economics promoters continue to consider the planet's natural resources as goods which could be 'harvested' for the purpose of wealth generation (Ganz *et al.*, 2003; Danida, 2007). Discussions continue among economists (e.g. Kozo and Gowdy, 1999; Costanza *et al.*, 1997; Kozo, 2001; Thampapillai *et al.*, 2007; Spash, 2009 and more) to find the most efficient way(s) to reduce environmental concerns without resulting in economic damage or decline. Some of the proposed alternatives consider that ecosystems are finite (e.g. which cannot be replenished) (Wu, 1977; Fengying and Ke, 2007; Zillion *et al.*, 2008), advocating for the search of ways to achieve better accountability for natural capital (Costanza *et al.*, 1997; Thampapillai *et al.*, 2007), or advocating for better usage of knowledge and technology can help substitute natural resources (Small and Jollands, 2006).

All these economic views have a growing effect on the way nations around the globe manage their environmental resource, given that environmental policies are influenced by the nations' natural capital scarcity (Thampapillai *et al.*, 2007). Moreover, in nations where natural capital (e.g. oil and gas) is regarded as infinite, or easily substituted concerns about environmental resources management are regarded as irrelevant by the leaders of such nations' economy (Colby, 1991), while in closed economic systems with resource scarcity (e.g. Japan, Singapore, Germany, Switzerland), environmental resources are regarded as economic externality and strong environmental resource management regulations which Colby (1991) refers to as 'command-and-control' are usually in place. From ecological economics, a new approach known as "deep ecology" was proposed to palliate the sustainability issues given that environmental issues continue to matter.

3.2.2 Deep Ecology

Deep ecology theory was introduced by Norwegian philosopher Arne Naess in 1972 who, first coined the expression to describe what he called the need for "ecological wisdom" (Taylor and Zimmerman, 2011) or "ecosophy" (Næss, 1973: 99). Deep ecology was regarded as the opposite of frontier economics. Deep ecology arose as a result of humankind actions which have damaged and impoverished the planet multiple ecosystems (Grey, 1993). The main belief is that all environmental organisms' species - fauna and flora - are linked in an intrinsic relationship (Næss, 1973); they have as equal a right to live and flourish as humans do. Colby (1991) considers that deep ecology combines several theoretical attitudes (old and new) that study human relationship with the planet ecosystems (with a prominence on societal, ethical

and spiritual aspects). In fact, proponents of deep ecology technology fixes as solutions to sustainability issues. They argue that technology fixes often lead to further environmental problems (Deval and Sessions, 1985). Consequently, deep ecologists believe that only by "re-sacralizing" humanity's perception of nature can the natural balance be re-established (Taylor and Zimmerman, 2011:2). A review of Deval and Sessions (1985) *Principles of Deep Ecology* (see Appendix D) reveals that deep ecology believers put nature above human interests which is the opposite of the frontier economics approach.

Deep ecology attracted various criticisms. For instance, Colby (1991) argues that implementing such an approach would lead to drastic changes in human society (in the legal, social and economic systems). Moreover, he stressed that the approach is extreme and anti-growth, making it unrealistic or "eco-topia" (Anderson, 2010; Kimmins, 2003). Ultimately, the approach is regarded as one which could lead to anarchism (Bookchin, 1995); as being vague and open to various interpretations. In fact, Bookchin (1987:3) nicknames the approach as "Eco-la-la". The acknowledgment of environmental problems in the context of frontier economics in the 1960s versus the growing Deep Ecology movement in the 1970s led to the need for compromises (Colby, 1991). This in turn led to environmental protection approach as a compromise, as explained below.

3.2.3 Environmental Protection

Compromises between ecological economics advocates and deep ecologists meant that economic growth and environmental management became two interrelated issues (Bridger and Luloff, 1998; Hopwood *et al.*, 2005). Under environmental protection, the economic view remains a "neo-classical model

of the closed economic system" (Colby 1991: 201). Moreover, the principal strategy of this approach is the legalization of the "environment as an economic externality" (Colby, 1991: 201). As such the environmental protection paradigm engendered many approaches and numerous conceptions which, were institutionalized in various countries. These included:

(1) The introduction of regulations within nations; referred to as "command-and-control" approach by Potoski and Prakash (2004: 154). Under environmental protection, governments adopt a deterrence enforcement which include full inspection(s) and audit(s) of organisation(s) and if applicable punishment for every violation.

(2) The creation in almost every UN's member nations of environmental protection agencies (e.g. the United States Environmental Protection Agency (EPA), the Scottish Environmental Protection Agency (SEPA), the Ghanaian Environmental Protection Agency) or ministries (e.g. French Ministry of the Environment) with extended responsibilities for setting limits, controlling or implementing regulations (Adams, 2006).

(3) The implementation of environmental Impact Statements or EIA and sustainability reporting (SR) as explained in the last chapter (see section 2.3.3)

(4) The internationalization of environmental management (Anderson and Brooks, 1996; Hansen, 1999; Levy and Kolk, 2002; Kolk and Tulder, 2003) which was initiated at the United Nations Conference in

Stockholm during which a Declaration on Human Environment was made (UNEP, 1972). The Stockholm Conference was the first UN's major conference on environmental problems and followed by many other conferences later (Vreugdenhil *et al.*, 2003).

Although progress was made, on international levels, in terms of treaties and agreements for better environmental protection, perceptions of environmental problems have differed between rich, poor, and developing nations. Hence, environmental protection across the globe led to Sustainable Resource Management theoretical framework, which is analysed below.

3.2.4 Sustainable Resource Management

In 1972, three Massachusetts Institute of Technology (MIT) scientists (Donnela Meadows, Dennis Meadows, and Jørgen Randers) created a computerized model that mathematically analysed global resource consumption and production. Their finding was the starting point of the Resource Management paradigm (RM) which is used by the US government to include all capital and resources (human, bio-physical, infrastructural, monetary) in all future nationals' calculations of state accounts, outputs, and regulations with regard to economic development (Colby, 1991). Colby (1991: 202) argues that RM includes theoretical aspects of the neoclassical economics (with considerable adaptation). Consequently he considers this paradigm to be "evolutionary", instead of "revolutionary". The paradigm led to the acceptance (at national and international level) of the existence of an interconnection between several of the planet resources (Colby, 1991). For example, forests role for locking up CO_2 is recognised under the paradigm;

also the paradigm recognises the interconnected role of forests as watersheds (i.e. rainforests) which affect hydropower and play a significant role in agricultural productivity (soil fertility) including fishery productivity is also established (Colby, 1991; Butler, 2011). This paradigm also establishes the notion that better resource management requires the stabilization and control of world population and the control and decrease of per-capita consumption (by means of increased efficiency) (Sinha *et al.*, 1988; Pimentel *et al.*, 1999; Martine, 2005; Diamon, 2008; Wackernagel and Russ, 2008; Sitarz, 2008; Msangi and Rosegrant, 2011).

3.2.5 Eco-Development

According to Swenson (1997) and Spedding (1996), resource management is an essential component of the eco-development paradigm. According to the UNEP and to the OECD, Eco-development refers to "*development at regional and local levels, consistent with the potentials of the area involved, with attention given to the adequate and rational use of natural resources, technological styles and organisational forms that respect the natural ecosystems and local social and cultural patterns*" (Bartelmus, 2003:119; HELIO, 2011:1). The paradigm expands the resource management theory by attempting to move away from a "polluter pay" system to a "pollution prevention pays" approach. Such action can lead to cost-saving opportunities (Swenson, 1997) and/or to a unique conservation-profit making system such as in Eco-tourism (Ghosh *et al.*, 2003). Blaikie (1992) and Chen *et al.* (2010) who refer to this theory as the "New Ecological Paradigm" (Chen *et al.*, 2010:1) argue that sustainability should be addressed on three levels: (i)

achievement of natural balances; (ii) adopting a limited growth approach; and (iii) revisiting the man domination over nature system.

Moreover, according to Adams (1990), the paradigm aims at improving societal conditions (i.e. poverty and famine reduction, extermination of diseases, reduction of weapons' dissemination, achievement of self sufficiency, etc); as well as environmental management (i.e. resources conservation, environmental protection). Adams (1990) suggests 11 principles of Eco-development (see Table 3.1 in the next page)

Thus, eco-development theory aims for efficiency and conservation (for natural resources and energy) and regards such resource management as beneficial not only to people but also to nations. It is well established that energy resources are a critical component of rich nations because sustainable energy production, energy efficiency and energy conservation are beneficial not only to one society but to all nations (Swenson, 1997).

Eco-development paradigm is also subject to various criticisms. For instance, the vagueness and elasticity of the term is criticized by many academics (Adams, 1990; Bartlett, 1998; Kates *et al.*, 2005). Its incorporation in any scheme (i.e. eco-industrialization, eco-tourism) is also challenged. Some critics believe that resource management/conservation can make the problem worse (Colby, 1991). For example, many eco-forestry management schemes have focussed on industrial forestry approach rather than communities and biodiversity approach and as a result, the problem has worsened. Indeed, in the case of Brazil, deforestation continues at an unsustainable level although

eco-development approaches were adopted in the country (Mongobay, 2010). Also, Ko *et al.* (2011), while reflecting on South Korea Eco-development scheme (in the Incheonm area), point out that Eco-development still requires the destruction of ecosystems; thus it is a controversial approach.

Table 3.1 Principles of Eco-Development

1. To institute beliefs and commitment 2. To improve governmental and institutions integrity 3. To reach international equality 4. To reduce poverty - famine 5. To exterminate malady 6. To diminish weapons dissemination 7. To achieve self-reliance and autonomy 8. To clean up cities' unpleasantness 9. To achieve equilibrium between human numbers and natural resources 10. To aim for resources conservation 11. To aim for environment protection

Source: Adams (1990:56), Green Development – environment and sustainability in the third world, London, UK: *Routledge.*

3.2.6 Environmental standards adoption framework

Huang and Shih (2008: 35) state that in the last decade, environmental management literature shifted away from its regulatory-based approach to centre on approaches promoting environmental standards adoption. Standards adoption by organisations are voluntary based approaches (Potoski and Prakash, 2004). Many environmental standards are governments sponsored (i.e. EU developed Eco-Management and Audit Scheme – EMA, British environmental management system standard - BS 7750.S) and others are non-state sponsored (i.e ISO standards, Responsible Care standards). As organisations see their competitors adopting environmental standards, they tend in this competitive world to do the same (Kotler, *et al.* 2001). Moreover,

Goldstein (2002: 504) argues that adopting standards will generate advantages for organisations such as: (i) a reduction in their environmental costs as dealing with stakeholders demands (i.e. community, customers, government) can be expensive; and (ii) better management practice within the organisation. As a result, many standards are available for organisations.

Furthermore, Zutshi and Sohal (2004) suggest a list of 'drivers' for the adoption of SEM by organisations. These included: (i) the market which is constituted of various external forces affecting organisations' competitiveness (as supported by Porter, 1991; Hutchinson, 1992); (ii) societal 'force' consisting of pressures and demands from various groups (the public, community) (as Hutchinson, 1992); and (iii) financial 'driver' representing pressures from financial and insurance institutions and including (possible) fines and legal liabilities (in case of non-compliance) and the (iv) regulatory 'force' consisting on national and international guidelines and regulations concerning environmental management (as Hutchinson, 1992). Moreover, Zutshi and Sohal (2004) state that the majority of senior executives now regard environmental concerns as a vital and essential element to their organisations.

The EMS theory has been disputed by various critics. For instance, Haufler (2000) regards the lack of coordination between EMS 'codes' with other environmental initiative as a problem. She argues that it undermines support for such environmental 'tools' (e.g. ISO 14000). Moreover, sceptics challenge the notion that environmental management programs generate the benefit which often outweighs organisations' cost (Pulver, 2001; Goldstein, 2002).

Indeed, Pulver (2001: 2) asserts that EMS is "a corporate green washing" of organisations' environmental destructive practices. In the same vein, Potoski and Prakash (2004) note that EMS self governance constitutes a licence to pollute or grants "a regulatory relief" (p.159) to organisations. Besides, it is argued that EMS is meaningless, and its purpose is designed to undermine government regulation. Indeed, Potoski and Prakash (2004) point out that organisation can exploit EMS to evade environmental regulations even more efficiently under lax monitoring. Furthermore, Potoski and Prakash (2004) argue that self-environmental policing can be effective if government and organisations cooperate, creating a win-win situation as a result. They note, however, that if the approach fails, the consequence will be a 'lose-lose' situation between the organisation and regulatory enforcement. Potoski and Prakash (2004: 159) state that many environmentalists oppose EMS self compliance incentives and are instead pushing for a "command-and-control" adversarial policies by the government. A further criticism is that EMS has failed to satisfactorily consider social issues (Vanclay, 2004; 2005).

In the preceding section, theories of environmental management are analysed. These included the ecological economic, deep ecology, the environmental protection, the resource management, the eco-development, and the environmental standards adoption. It is apparent that historically, rather than having been proactive, environmental management activities have been reactive (Reagan, 2006). Moreover, it emerged that the achievement of environmental management is a long term perspective that requires vision, adaptability, motivation and resilience (Munn, 1987; Reagan, 2006). In adopting these theories, a number of studies (Esty and Porter, 1998; Hillary,

2004; Zutshi and Sohal, 2004; and Salmi, 2008) have highlighted the importance of examining drivers for adopting environmental management actions as an essential tool in the 'fight' for sustainability. As such, the following section will focus on drivers towards sustainability at organisation and individual levels.

3.3 FACTORS INFLUENCING SUSTAINABILITY

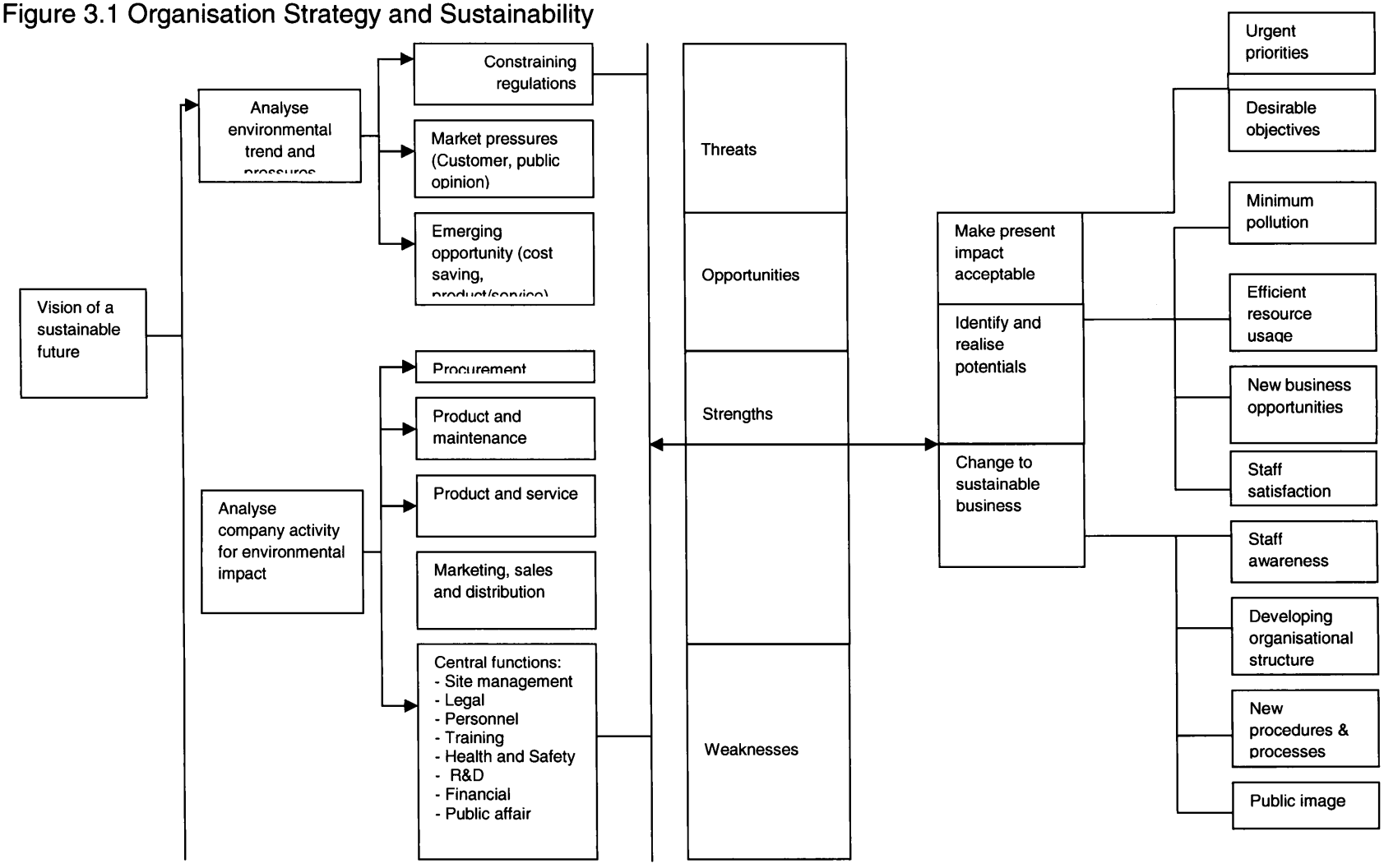
Factor or driver towards sustainability refers to motivations to adopt environmental management initiatives (Asmar, 2009). Sustainability factors are classified into two categories: (a) sustainability factors at individual level; and (b) sustainability factors at organisational level. This part will focus on sustainability factors at organisational level.

3.3.1 Why focusing on organisations?

By organisations, this study implies very diverse entities which can include sole traders, family-owned business, governments institutions (i.e armed forces, ministries), non-governmental institutions, hospitals, corporate farms, multinational companies and more (Daft, 2009). According to various authors (See Craig, 1996; Stern, 2000; Hassan *et al.*, 2002; Kwong, 2005), the responsibilities of organisations with regard to environmental pollutions (and degradation) have long been well established. Moreover, Eligh (1998:2) argues that the global approach on environmental management (based on the political will of sovereign nations) is not the best way to achieve successful implementation of sustainability. As an alternative, Eligh proposes the

implementation of new strategies focussing on environmental management system at regional and organisational level as the most efficient strategy to achieve a steady transformation of environmental performance (Welford, 1996). Moreover, Hutchinson (1992) asserts that organisations' environmental strategies should be based on external as well as internal factors. Elements such as legislation, market pressures, cost opportunities, organisations' environmental impact (energy usage, wastes generated, etc) and social impacts (i.e. community impact) constitutes organisations influential factors to sustainability. Hutchison argues that such elements should be analysed by organisations using a SWOT (strengths, weaknesses, opportunities and threats) analysis method as it enables organisations to develop efficient strategies with regard to their environmental performance (see Figure 3.1 in the following page). Moreover, he adds that such strategies, if designed properly would (i) enable a reduction of present environmental impact within organisations, making it acceptable; (ii) enable organisations to identify their sources of environmental 'damages' and deal with them (i.e. reduction of water consumption, energy waste); and (iii) enable the organisation to switch to a sustainable business, which involve creating environmental awareness and training within the organisation, changing the organisation culture, using cleaner and efficient technology, improving the organisation's public image (Bhargava and Welford, 1996).

Figure 3.1 Organisation Strategy and Sustainability



Source: Hutchison, C. (1992), Corporate strategy and the environment, *Journal of Long Range Planning*, Vol.25, Issue No.4, pp.9.2: In Bhargava, S., and Welford, R. (1996:24), Corporate Strategy and the Environment: The Theory, In Welford, R (Ed) *Corporate environmental Management: Systems and Strategies*, Earthscan, London: UK.

3.3.2 Sustainability drivers at organisational level

According to Roberts (1995) and Eligh (1998), the place or location where an organisation is based has a direct influence on such organisation through a complex connection between the political, the environmental and economic activities. Roberts (1995) states that the location of an organisation affects their overall environmental strategy. Moreover, Freeman (1999) proposed the stakeholder theory, as an alternative to existing strategies focussing on shareholder solution for better environmental performances. Freeman's theory is not related to environmental management issues, but researchers such as Baumast (2001) and Delmas and Toffel (2003) extended his theory to sustainable development issues. Baumast (2001) and Delmas and Toffel (2003) argue that the pressure exerted on organisations by institutional actors or environmental stakeholders is perceived by these organisations' decision makers (to a certain extent) as forcing them to take action. This has prompted the development of theories advocating a focus on stakeholders' influences within organisations as the best approach for solving environmental problems. Indeed, authors such as Goldstein (2002), Cassimir and Dutilh (2003), and Bebbington and Barter (2011) regard stakeholders as determinant sustainability 'factors' (at organisation level). For instance, Bebbington and Barter (2011:5) for instance point out the need for collaboration between organisations and their significant stakeholders with regard to environmental sustainability. Moreover, Stakeholders are classified in two categories (internal stakeholders and external stakeholders) and include governments, society, consumer, suppliers, employees, funders and industries (Meina, 1994; Goldstein, 2002; Cassimir and Dutilh, 2003; Bebbington and Barter, 2011).

3.3.2.1 External Factor(s) to Sustainability

The external drivers to sustainability are political (regulations), economic (e.g. consumption; consumers or users of services) and social (e.g. community).

3.3.2.1.1 The political: environmental regulation

Political (national and international regulators) influences are considered by many academics as one of the main drivers to organisations adoption of sustainability measures (Delmas and Toffel, 2003; Baumast, 2001). Environmental regulation or legislation is defined as "a mechanism for restricting access to the commons" (Hasnas, 2009: 103), the common representing "the commonly held resources" (Hasnas, 2009: 96). According to a number of academics (e.g. Fiorino, 2006; Gurtoo and Antony, 2007; Hasnas, 2009; Lange and Gouldson, 2010), environmental regulation 'tool' (at organisational level) is the most efficient and convincing strategy to engage environmental management problems as environmental problems are public policy issues. For the purpose of illustration, Goldstein (2002) points out that a 1992 survey between Minnesota's largest manufacturing organisations revealed that 65% of the companies' executives regarded compliance to regulation as the main factors of their firm environmental management. Similarly, the 2005 Eurobarometer report confirms the importance of regulation as a determinant factor of environmental practice across the European Union. More recently, a 2010 survey in Singapore also established that regulation is one of the main factors influencing organisations with regard to sustainability (Khanna *et al.*, 2010).

Environmental regulation is made up of complex international treaties and laws. National environmental laws need to be in compliance with international treaty (ies) obligations (Yang, 2006). There are various approaches to environmental regulation which are listed in Appendix I. These include: (a) the development of the recycling industry; (b) a considerable growth of the reusable goods market; and (c) the development of proficient environmental technologies; all of which can create substantial economic growth (Gurtoo and Antony, 2006).

However, this regulatory framework is often criticized in the literature. For example, Walley and Whitehead (1994) criticise Porter's (1991) argument that environmental regulation can lead to benefits such as cost outweigh. Similarly, Xepapadeas and de Zeeuw (1999) note that environmental regulations hurts organisations' profitability when compared to pre-environmental regulation compliance period. Moreover, Potoski and Prakash (2004) and Yang (2006) argue that deterrence enforcement can either lead to 'confrontational' relationship among regulatory bodies, environmental groups, and corporation or it can lead to rejection of environmental regulators. The most recurrent criticism is that regulation is too costly for businesses. Crew and Heyes (2005) highlight that in the USA, the cost for businesses to comply with regulations is around $500 billion per annum or around 10% of USA GDP. Moreover, Fiorino (2006) notes that it costs more than $200 billion annually to the USA to reinforce environmental regulations. Other criticisms included complaints that environmental regulations deliver too little benefits (by contrast to its cost), and that they create distrust between all stakeholders (government,

businesses and environmental groups), and thus increase the transactional costs of the regulation (Fiorino, 2006).

Based on the preceding, it is hypothesised that organisations adopt sustainability measures because of governments' regulations. Hence the hypothesis ***$H_3$1: Environmental regulation is the main reason why organisations adopt sustainability practices***

3.3.2.1.2 Economic drivers of sustainability (consumption)

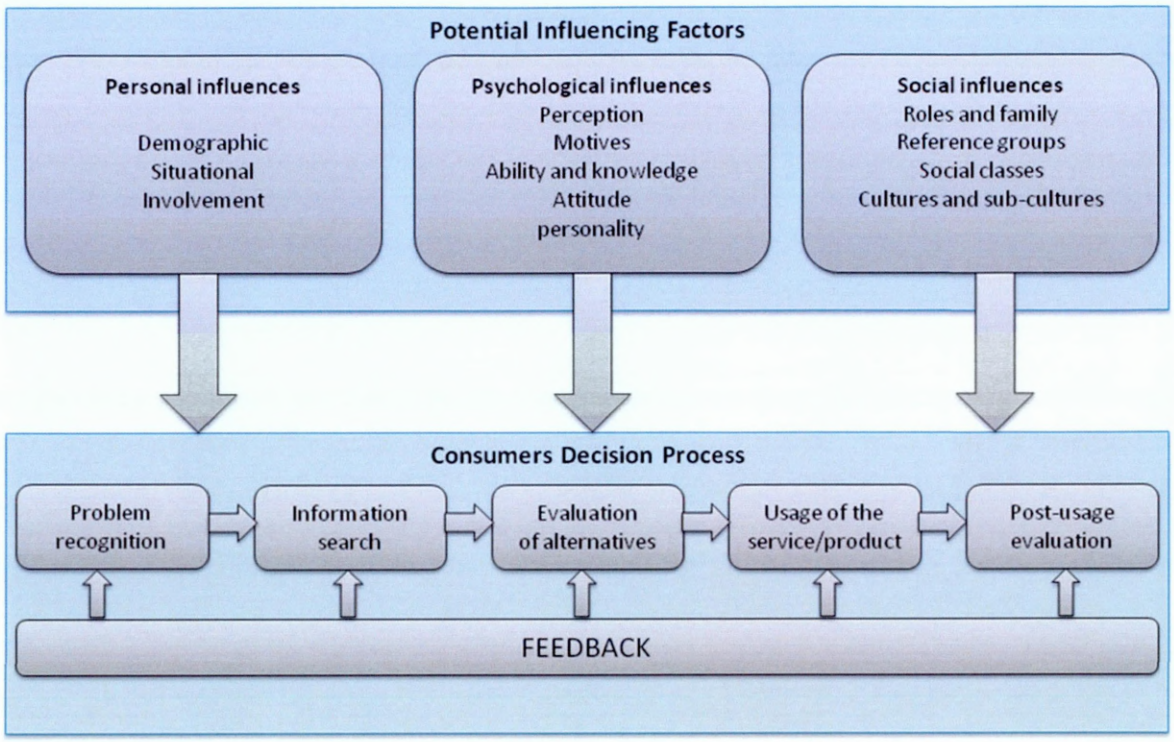
Consumers/customers are considered to exercise a vast influence on organisations' environmental activities (Delmas and Toffel, 2003; Baumast, 2001). Indeed, it is widely believed that customer satisfaction is the key to success in business. Therefore, fulfilling customers' requirements is essential for any organisation (Gerrit *et al.*, 1998; Daskin, 2004). Consumer's decision to use or to purchase an organisation's products/services is the end of a process involving many stages and specific influences (illustrated in Figure 3.2, see next page). These influences are listed by Dibb and Simkin (2001) as:

a. a standard decision making process [i.e. (i) the acknowledgement that something is missing, (ii) the search for information, (iii) the evaluation of the service or product (iv) the final selection of the service/product and the purchase act, and (v) the post-usage of the service/product]; and

b. potential influential factors which included customers' (a) social influences [(i.e. culture, family roles, etc)]; (b) personal influences (i.e.

demographic factors, situation, etc); and (c) psychological influences (i.e. perception, motivation, etc).

Figure 3.2 The Consumer Decision Process



Source: Adapted from Dibb and Simkin (2001:31), Marketing Briefs: A revision and Study Guide, Oxford, UK: Elsevier Butterworth-Heinemann

Lovelock *et al.* (1999: 124) argues that customer expectation has a zone of tolerance. Kotler *et al.* (2001) add that customer's satisfaction is related to organisations' performance in the light of the customer's expectations (thus within their zone of tolerance) (Lovelock *et al.*, 1999). McEachern and Schoder (2004) conclude that superior knowledge of customer's perceptions of value (i.e. how they value the environment) is a critical success factor in today's competitive marketplace (for organisations). Furthermore, as seen in the preceding sections (and in chapter 2), environmental concerns and behaviours are also influenced by elements such as social status, culture,

education, and values. Moreover, consumption perception and awareness with regard to environmental issues is increasing (Baumast, 2001; Goldstein, 2002). In line with the aforementioned, Laroche *et al.* (2001) assert that a UK study of female consumers' perception of organisation' environmental claims have found that 79% of the sample agreed to pay up to 40% more for a product which have been proven to be green compared the ones they were already using. These findings demonstrate the potential gains organisations might earn if implementing environmental green practices. However, Laroche *et al.* (2001) also warn that organisations which do not adopt green practices or which try to exploit green movement to increase sales are exposing themselves to consumers boycott.

Another economic driver is the suppliers. Any organisation's strategy, whether product or service-oriented, is dependent on suppliers (Prahinski and Benton, 2004; Jelínek, 2004). Moreover, good and reliable suppliers are essential for any organisation to operate normally (Bakos and Brynjolfsson, 1993). Thus building a good supplier relationship as well as building good relationship with consumers is essential (Christopher *et al.*, 2005). More and more suppliers are pushing corporate business to implement 'green innovation' such as green product processes (Chiou *et al.*, 2011). As such, suppliers' involvement in environmental matters is decisive for the achievement of environmental performance by an organisation (Geffen and Rothenberg, 2000). Indeed, Geffen and Rothenberg argue that they are a source of innovative ideas, and they play a vital role in new product development and technological innovations for environmental management. Suppliers have a privileged access to external information which could help an organisation improve its

environmental impact. Therefore organisations can gain competitive advantage from privileged relationships with suppliers due to the information received from their suppliers (Porter and Millar, 1985; Porter, 1985; Chiou *et al.*, 2011).

3.3.2.1.3 Social drivers to sustainability

Communities usually respond to environmental issues by various actions (such as protest, legal actions, etc) (Cutter, 1995; Kaswan, 1997; Stephens *et al.*, 2001). As such, communities constitute important drivers to the adoption of sustainable practices. Moreover, Lawrence and Morell (1995, in Delmas and Toffel, 2003) established that environmentally proactive organisations are motivated by the regulations along with costs reduction as well as by the fear of becoming the target of environmental Non-Governmental Organisations (NGOs) and/or local communities' actions. According to Teegen *et al.* (2004: 475; in Allard and Martinez, 2008) NGOs have become "major new organisational forms and vehicles to deliver social services such as poverty relief and environmental protections". Indeed, Matthews (1997) states that they now have various operations ranging from protest, advocacy, and mobilizing communities and public support, to face issues such as legal matters, scientific issues, technical and policy analyses. NGOs' greatest accomplishments have been their ability to pressure states. For instance, they have been decisive over important public policy debates (Schwartz, 2008) or over issues such as the issuing of mining license to a particular corporation (Nelson, 2007). Moreover, NGOs' influence over multinational corporations is growing. Indeed, they have driven many organisations' executives to

internalize social and environmental responsibility even with no evident economic benefit (Allard and Martinez, 2008).

To summarised, external factors can influence organisations environmental policies. These include environmental regulations, economic drivers and social drivers. Internal drivers to sustainability are presented in the following section.

3.3.2.2 Internal factors to sustainability

As stated earlier in this chapter as well as external influences there are internal influences towards organisations' sustainability. These internal influences come from shareholders and/or owners, and employees.

3.3.2.2.1 Shareholders/owners

Shareholders' environmental values have a significant influence on the way an organisation acts (Ählström *et al.*, 2005). Milstein *et al.* (2002) and Hart and York (2002) suggest that organisations (from various industries) are increasingly subjected to various coercive pressures from shareholders which tend to lead to different environmental strategies. Ernst and Young (2011) argue that the reason (at least in part) is the fact that investors are becoming increasingly aware of the threat of reputation as well as financial risks associated with environmental issues. In fact, shareholders or owners can influence their organisations' environmental practice, as long as they do not perceive it as an 'exasperating cost or unavoidable threats' (Porter and Van Der Linde, 1995). As such, shareholders are ever more pressing organisations' boards to consider social and environmental risks as part of

their strategies. Moreover, whenever shareholders are keen supporters of environmental management, the organisation tends to adopt environmentally friendly actions (Delmas and Toffel, 2003; Ernst and Young, 2011). Besides, when shareholders adopt a contrary attitude, organisations' impacts on the environment tend to be higher (Delmas and Toffel, 2003).

3.3.2.2.2 Employees/managers

A 2001 UK survey by the Industry Society on organisations' employees concerns found that 82% of the UK employees would refuse to work for organisations whose values they do not share, and 52% of the employees said that they choose their current workplace because they shared the organisations' values and beliefs (see Willard, 2005: 139). Moreover, Stern (2000) argues that environmentally aware individuals will behave significantly in ways that will affect their workplace environmental management strategies. Wagner and Llerena (2008) add that environmentally concerned employees often are the promoters of sustainability within their organisations (i.e. promoting technological shift towards sustainability-related innovation, CSR adoption, SEM adoption, etc). For instance, Willard (2005: 139) states that a Canadian survey commissioned by MarketExplorers and the Conference Board of Canada in 2000 found that 71% of the Canadian employees aspire to work for organisations that were committed to environmental issues as well as to social and community concerns. Elements such as national culture and education, community traditions and beliefs shape an employee's culture and values, his/her perception, attitude and behaviour towards the environment (Guagnano, 1995; Vorkinn and Riese, 2001; Nielsen *et al.*, 2003; Todd *et al.*, 2006; Harris, 2006; OECD, 2007; Hunter *et al.*, 2010;). This in turn has an

impact on his/her environmental behaviour (Stern, 2000; Casimir and Dutilh, 2003; Ziadat, 2010).

Similarly, various authors consider managers' commitment to sustainability as fundamental for achieving a shift from 'old organisational habits' to 'new environmental friendly initiatives' (see Delmas and Toffel, 2003; Zutshi and Sohal, 2004; El Dief and Font, 2010; López-Gamero *et al.*, 2011). Indeed, DiMaggio and Powell (1983) and López-Gamero *et al.* (2011) argue that managers' perceptions of environmental issues are determinants for achieving sustainability. Elements affecting managers' perception of sustainability are environmental regulations, stakeholders' expectations, and uncertainty. Managers can drive their organisations towards pro-active environmental management with noticeable advantages (Delmas and Toffel, 2003; Smith, 2003). In this respect, Barrow (2003: 2) argues that it is the responsibility of managers to organize and to centre resources to (a) the improvement of people well-being, and (b) to alleviate or prevent further damages to the planet ecosystems. Moreover, the aforementioned highlights the importance of organisations in the 'fight' for sustainability. Indeed, organisations have the most impact on the environment. Hence the following Hypothesis is made:

$H_3$2: Organisations' employees are environmentally aware

This section has presented external factors (regulation, economic and consumers) and internal factor (shareholders, owners, employees) influencing organisation's sustainability strategies. Moreover, it has been established that turning organisations 'greening' implies involving employees in the process. Indeed, employees' negative actions lead to their organisation having higher

negative impacts on communities and on the environment (Stern, 2000; Welcome Trust Centre for the History of Medicine, 2004). However, employee involvement in the 'greening' of organisations necessitates achieving environmental awareness among employees (Hutchison, 1992; Goldstein, 2002). The remaining part of the chapter focuses on the review of the literature on EA.

3.4 ENVIRONMENTAL AWARENESS

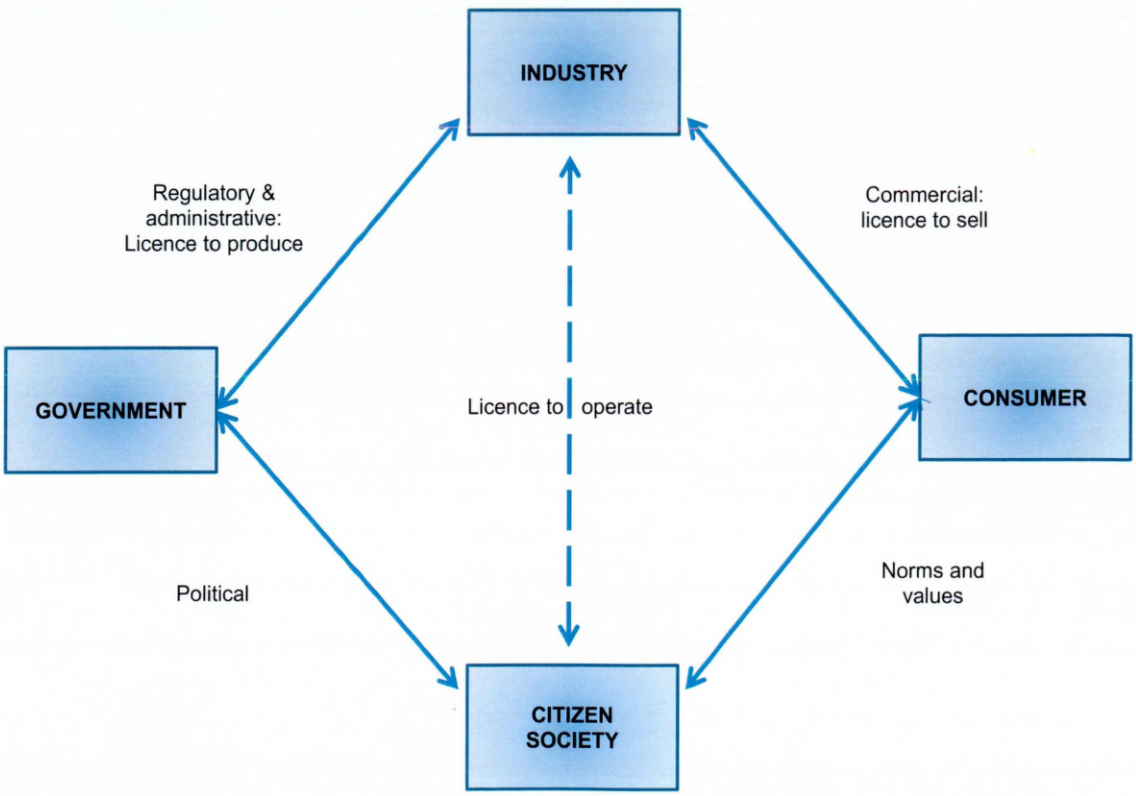
Studies of environmental awareness (Amyx *et al.*, 1994; Baumast, 2001; Del Brı´o and Junquera, 2001; Casimir and Dutilh, 2003; Harris, 2006; Önder, 2006; Anderson *et al.*, 2007; Abdul-Wahab, 2008; Byrch *et al.*, 2009; Khanna *et al.*, 2010) agree that environmental problems should be addressed by:

(1) Improving the interaction between the various stakeholders (see Figure 3.3 in the following page): individuals, communities, organisations, governments - all having an impact on the environment. For example, consumers have a direct and influential relationship with industry (which develop and produce goods with the intention to sell it to customers) whose goods can be rejected if they do not meet customers' standards. Citizens have a direct relationship with governments as they are the ones who elected government officials. Thus, government performance is constantly evaluated by the general public or by "groups of citizens united in non-governmental organisations" (Casimir and Dutilh, 2003: 318).

(2) Improving stakeholders' perception or understanding of environmental issues and management (Amyx *et al.*, 1994). Indeed, Hunter *et al.* (2010) consider that focusing on environmental perception offer deeper appreciation of the intricate nature of environmental concern. For instance, studies show that people living in poor environmental conditions tend to be more aware of environmental problems (Hunter *et al.*, 2010).

(3) Focusing on 'drivers' of sustainability (Khanna *et al.*, 2010). For instance, the previous part presented internal as well as external factor to organisations' sustainability strategies.

Figure 3.3 - Interaction between the Various Stakeholders Involve in Sustainable Development



Source: Casimir, G., and Dutilh, C. (2003:317), Sustainability: a gender studies perspective, *International Journal of Consumer Studies*, Vol.27, Issue No.4.

3.4.1 Understanding Environmental Awareness

Castelli's (2004) study of United States teachers' perceptions of environmental problems impacts concluded that most respondents lacked environmental awareness. A similar finding was established by Asmar (2009) who investigated students' environment management in the U.S and concluded that students did not comprehend the paradigm. Also, Byrch *et al.*'s (2009) study of New Zealanders' understanding of 'sustainable development' found a comparable conclusion. Three studies (Castelli, 2004; Asmar, 2009; Byrch *et al.*, 2009) draw attention to a significant finding, which is that each individual (organisation) has a unique perception and understanding of sustainable development. Moreover, although Byrch *et al.* (2009) state that each stakeholder's understanding of sustainability is slanted and normative, they argue that "the lack of one clear vision" (Byrch *et al.*, 2009: 3), of a clear definition, creates confusion and misunderstanding of environmental concerns. In fact, a similar conclusion was reached by Marquit (2008) from his study of corporate environmental accountability research in Utah, that environmental awareness paradigm faces challenges due to the 'proliferation' of concepts, factors as well as the lack of a clear definition.

Lizuka (2000: 32) refers to environmental awareness as a pro "environmental attitude-behaviour", while Stern (2000: 411) refers to it as 'environmentalism' which he describes as "the propensity to take actions with pro-environmental intent". Although many authors (see Lizuka, 2000; Stern, 2000; Tatoğlu *et al.*, 2000; Casimir and Dutilh, 2003; Anderson *et al.*, 2007; Önder, 2006; Khanna *et al.*, 2007; McCallum *et al.*, 2007; Abdul-Wahab, 2008; Byrch *et al.*, 2009; Khanna *et al.*, 2010; Ziadat, 2010) name it differently, they all recognise that

environmental awareness requires the following: (i) knowledge of environmental problems; (ii) knowledge of how to remediate to such environmental issues; and (iii) environmental actions.

Advocates of environmental awareness call for greater public participation as an indispensable element of the move towards sustainable development (Council on Environmental Quality, 1997; Brodsky, 2007). Moreover, they argue that the achievement of public participation requires the attainment of public awareness given that environmental awareness leads to sustainable behaviours (Eligh, 1998; Lizuka; 2000; Castelli, 2004; Duroy, 2005; Asmar, 2009; Byrch *et al.*, 2009; Ziadat, 2010). It is also agreed among environmental awareness advocates that such awareness can only be achieved through the following three approaches:

(1) The consideration of public's (i.e. individuals, communities) 'perceived impact on the environment' as their perception of environmental damages affects their environmental behaviours (Castelli, 2004; Eligh, 1998; Baumast, 2001; Salgado Carvalho and Fidélis, 2009). It comprises taking into account key factors such as:

(a) Psychological influences (e.g. attitudes, values, etc.) (Clark *et al.*, 2003; Duroy, 2005);

(b) Economic factors (e.g. unemployment, inflation, wages, etc.) (Kollmuss and Agyeman, 2002); and

(c) Social factors (e.g. family, culture and traditions, etc.) (Kollmuss and Agyeman, 2002; Eurobarometer, 2005)

(2) Environmental education of the public (Ählström *et al.*, 2005; Coyle, 2005; Asmar, 2009; Byrch *et al.*, 2009). The aim is to ensure that the public is familiar with Roth's (1992:18) four concepts: Knowledge, effect, skills and behaviour (see section 2.3.2.3 for more details)

(3) Regulation implementation (Stern, 2000; Fiorino, 2006; Gadenne *et al.*, 2008; Hasnas, 2009). A study by the Eurobarometer (a European Commission institution) in 2005 found out that 45% of Europeans regard environmental legislation as decisive for the implementation of environmentally friendly behaviours (Eurobarometer, 2005).

Furthermore, Anderson (2007) argues that environmental awareness requires more than just environmental knowledge acquisition and states that understanding attitudes, beliefs and concerns are fundamental for the achievement of ecological goals. Based on a similar analysis, a number of studies have focused on investigating stakeholders' (individuals, communities and organisations) perceptions of their actions' impact on the planet (Baumast, 2001; Anderson *et al.*, 2007), and the effects (or impact) of such perceptions on their environmental behaviour (Sroufe, 2003). In other words, they have investigated people's awareness of environmental issues as a solution to sustainability problems (Stern *et al.*, 1995; Mascaro and Scott, 2008; Ziadat, 2010). Leiserowitz (2006, 2007) argues that perception leads to action. Thus it is important to analyse stakeholders' perception in order to grasp the elements involved in the achievement of public awareness.

3.4.2 Stakeholders' Perception of Environmental Problems

Bogner and Wiseman (1999 and 2002) state that stakeholders' environmental perceptions can be construed under two contrasting perspectives:

(a) an anthropocentric view, which carries the belief that nature existence is solely for the benefit of humankind and that nature resources are accessible commodities to be used by humans to improve their lifestyle and/or quality of life (Pepper, 1984); or

(b) an eco-centric view which maintains the belief that humanity has no choice than to exploit nature resources but it must do so in a fairer and ethical way (thus rejecting abuse) (Purser and Montuori, 1996: 611).

However, a review of studies by Adams (1990), Baumast (2001), Ghosh *et al.* (2003), Liu (2003), Vreugdenhil *et al.* (2003), Heyd (2007), Asmar (2009), Byrch *et al.* (2009), Shaw *et al.* (2009), López-Gamero *et al.* (2011), confirms the dominance of the eco-centric view thus matching Colby's (1991) assertion that eco-development is the 'way forward'. The preceding is therefore based on eco-centrism perspective.

Leiserowitz (2006, 2007) claims that public perception of environmental risks influences the way the public behaves. Thus, support or opposition to pro-environmental actions is influenced by their perception of environmental risks. Leiserowitz (2007) also states that awareness (of environmental problems) is an important but insufficient condition to motivate an individual or to generate a collective response to ecological problems. This calls to mind the assertion

of Bogner and Wiseman's (2002) that environmental attitudes' construction consists of three essential components: (i) cognitive elements (i.e. education, mental processed, reasoning, knowledge), (ii) elements relating to the affects (culture, values, feelings, emotions; affection), and (iii) cognative elements. Many studies have confirmed these elements as it will be explained below.

3.4.3 Education Influence on Environmental Awareness

An ancient Chinese proverb, states: "If you plan for one year, plant rice. If you plan for 10 years, plant trees. If you plan for 100 years, educate people" (Gupta, 2000:171). In accordance with such proverb, many authors consider that environmental management problems can only be resolved through education (Gupta, 2000; Durga, 2004). As such, Chen *et al.* (2010) assert that educated individuals are more exposed to environmental information and are more likely to be environmentally aware. Also, Ählström *et al.* (2005) view environmental education as an important factor of (environmental) behaviour motivation. Furthermore, Chawla and Cushing (2007) states that most environmental educational research has focussed on individual action (i.e. recycling, green purchasing, turning off the lights if not needed). Although such actions are good, Chawla and Cushing (2007) argue that if an impact is to be made, environmental education must also focus on educating the collective public.

Moreover, Coyle (2005) states that a high degree of environmental literacy correlates significantly with a high level of environmentally friendly behaviour. However, he stresses that true environmental education takes time. Agreeing with this assertion, Cetin and Nisanci (2010: 1831) consider environmental

education as a lifelong process that commences with family and friends, is carried on at school and universities, and can help create a 'new generation' of socially and environmentally responsible citizens. Furthermore, Eurobarometer (2005) in their 2005 study measuring environmental awareness at European level found out that 57% of European citizens who made efforts to protect the environment were not convinced that their actions could change the situation. Thus a challenge of education is also to demonstrate to citizens that their actions, although small can make an impact (Eurobarometer, 2005).

3.4.4 Cultural Influence on Environmental Awareness

It is believed that sustainable ways of life are best acquired through culture (Asmar, 2009: 31). Rapoport (1980, in Al-Soliman, 1990) and Thompson (1997) assert that cultural beliefs engender a particular way of viewing the environment and that these views echo principles and affect choices. Meina (1994) and Heyd (2007: 18) argue that the planet environmental degradation is mainly due to stakeholders damaging actions, which are not affected by moral appeal, namely corporations. Heyd (2007) proposes that environmental ethic (e.g. "reflection on morality") (Heyd, 2007:25) and morals should become the essential aspects of society if changes to humanity practices, routines and beliefs (with regard to the nature) are to be achieved. Heyd (2007) concludes that environmental ethic and morality can generate appropriate "attitudes and patterns of action" (Heyd, 2007:22) which, with time, can exemplify an individual's character and affect organisations' actions on nature (i.e. organisations are composed of individuals; if all of those implement environmental ethic and morality principles, it will improve environmental

impact on nature). Hence, nurturing a 'sustainable culture' becomes an imperative feature of achieving sustainability. Asmar (2009) regards the fostering of (sustainable) culture as an effective way of encouraging habits and values favouring sustainable lifestyles. She also stresses the fact that such a cultural shift must be a collective initiative. Indeed, Asmar (2009) argues for the alteration of culture to include 'environmental friendly' elements in every aspect of people's everyday life. Asmar's argument reflects Lizuka's (2000) assertion that individual's values and worldview should be altered if sustainability is to be achieved. Indeed, Lizuka (2000:23) argues that values "act as filters for new information or ideas" and that information penetrating these 'filters' will influence the formation of attitudes. Likewise, Asmar (2009) cites the "*Structural Functionalism theory*" of sociologist Emile Durkheim which postulates that humanity and civilizations do change to meet needs (see Whitney, 1975:361). Thus, sustainability must become an objective that society has to aim for and incorporate in order to achieve sustainable practices (Lizuka, 2000; Asmar, 2009).

3.4.5 Socio–Demographic Variables as Determinants of Environmental Awareness

Based on data from the National Opinion Research Center's General Social Surveys (1973-1990), Jones and Dunlap (1992) established that young adult, well-educated, Democratic and Liberals parties' members, and urban areas residents were consistently environmentally aware. Similarly, Lizuka (2000) and Marquit (2008) stress that socio-demographic variables affect people's knowledge of the environment. Moreover, Turner and Pei Wu (2002) state that many studies have established that people's 'social identity' does shape the

way they view and behave with the environment. These include components such as gender, age, socioeconomic status, political orientation, religion, and more (Marquit, 2008).

(1) The age factor; a variety of studies have established a direct 'link' between people's age and their environmental concern(s) (see Van Liere and Dunlap, 1981; Mohai and Twight, 1987; Aminrad *et al.*, 2011). Lizuka (2000: 17) argues that people's views and attitude change with the ageing process and younger generation are generally more concerned about their environmental quality than the older generations. Lizuka's statement is arguable and needs to be tested.

(2) Gender influences; the Eurobarometer study found that men were more concerned about the climate change issue, while women were more concerned about natural disasters and impact on health (Eurobarometer, 2005). Also, Harris (1989) found that women were more willing to accept lower standard of living for the cause of environmental protection as they feared health risks more than men. Moreover, a study by Guagnano (1995) found that women expressed stronger intentions and beliefs to engage in pro-environmental behaviour than men. More recently, Chen *et al.* (2010) assert that women are more likely to engage in pro-environmental action and they are more environmentally aware than men. These views from Guagnano (1995), the Eurobarometer (2005) and Chen *et al.* (2010) require testing.

(3) Concerning social status, Van Liere and Dunlap (1980) argue that a positive association exists between environmental concerns and social status

(indicated by income, education, and occupational prestige). Indeed, Lizuka (2000) notes that economics studies in relation to environmental concerns have demonstrated that there is a relationship between income and environmental quality. Undeniably, environmental quality is sometimes regarded as a "luxury good that become of concern only when basic needs have been met; thus developed countries are more likely to exhibit a strong demand for environmental quality than developing ones" (Duroy, 2006: 2). Moreover, researchers such as Castelli (2004), Asmar (2009), Boland and Heintzman (2009), and Chen *et al.* (2010) have established that the more educated an individual becomes the more concerned they become about the environment. This association between people's education level, their social status and environmental concerns needs to be tested.

(4) Political ideology is considered to have an impact on environmental concerns (Lizuka, 2000). Indeed, in the United Kingdom for instance, Worcester and Corrado (1991) regard Tory voters as less concerned about the environment than Labour and Liberal Democrat voters. In the US, Jones and Dunlap (1992) argue that Democrat party members as well as Liberal party members are more environmentally concerned than others. Lizuka (2000) criticizes these views by arguing that they are western-based (as political party lines are clearly defined) and might not be measurable in other non-western countries. Moreover, Lizuka (2000: 21) adds that "political ideology is not a pre-requisite for having the environmental concern but it comes afterwards".

Based on the preceding which regard socio – demographic variables as determinants of environmental awareness, the following hypothesis is made:

$H_3$3: There is a correlation between socio-demographic variables (gender, age, profession, parental status, education level) and people's environmental awareness.

3.4.6 Environmental Action

The biggest environmental problem is the humankind's (destructive) behaviour which damages the environment (Boulding, 1966; Colby, 1991; Stern, 2000; UNEP, 2002; Bunnin and Tsui-James, 2003; UNEP, 2004; Cochrane, 2006, Brodsky, 2007; United Nations Global Compact, 2011). Consequently, encouraging (environmentally) cognative actions (i.e. behaviour directed towards action, change and including impulse, desire, etc) would reverse people's destructive actions (Bogner and Wiseman, 2002; Asmar, 2009; Boland and Heintzman, 2009). As such, Baumast (2001) and Castelli (2004) argue that environmental awareness leads to action. Boland and Heintzman (2009) remark that participants in environmental awareness programmes said that their attitudes towards the environment change positively, and they displayed significant environmentally friendly behaviour. Stern (2000: 408) defines environmentally significant behaviour as "behaviour that is undertaken with the intention to change (normally to benefit) the environment". Stern's (2000) definition highlights two facts: (i) environmental intention is not correlated to behaviour; and (ii) there is always the possibility that environmental intention may not result in environmental actions or even impact. Moreover, Stern (2000) establishes that there are 4 types of significant environmental behaviours (see Table 3.2): (i) environmental activists; (ii)

environmental non-activist in the public sphere; (iii) private sphere environmentalists; and (iv) other environmental behaviours.

Table 3.2 Classification of Environmental Behaviours

1. Environmental Activism	Regroups dedicated ecological activists (e.g. those actively involved in environmental NGOs such as Green Peace and participating actively to manifestations). Stern (2000: 409) notes that such activists are the focus of major studies on social movement involvement.
2. Non-activist environmental behaviour in the public sphere	Constituted by people who are environmentally aware and who support indirectly environmental causes (i.e. paying a monthly contribution to environmental organisations, signing environmental petitions). However, those individuals also support or accept public policies on environmental issues (i.e acceptance of environmental regulations, willingness to pay higher taxes (if the State requires it) for ecological protection). Stern (2000) states that as public policies can change many people and organisations' ecological 'behaviours', this group is important with regard to the fight for environmental management.
3. Private-sphere environmentalism	Include individuals exhibiting environmentally friendly attitudes in their private sphere (i.e. attitudes such as green consumerism: purchases (household) goods and services with lesser ecological impact, recycling, etc). Their actions according to Stern (2000) have direct environmental consequences (although the overall impact on the nature is small)
4. Other environmentally significant behaviours	According to Stern (2000), it consists of individuals whose action may affect considerably the environment through other behaviours such as influencing the actions of organisations to which they belong (for instance an employee convincing his firm to purchase only recycled paper for their printer or to print less)

Source: Stern Paul. (2000:409-410), Towards a coherent theory of environmentally significant behaviour, *Journal of Social Issues*, Vol. 56. Issue No.3.

Moreover, findings from Byrch *et al.*'s (2009) research on environmental awareness in New Zealand reveal that there are five types of environmental behaviour:

(a) The societalists. They are composed of pragmatic environmentalists. They are prompt to act and to endeavour to find solutions rather than delaying in debate.

(b) The realists. They are constituted of individuals having a strong belief that society can find solutions to environmental problems. They believe that the environment changes continuously (due to human activities or not) and that new, adapted, and tangible solutions are needed continuously to respond to the issues as they arise.

(c) The ecologists. They are made of individuals acknowledging humanity's dependence on nature. They regard environmental management as a system which allows humanity to retain an acceptable and good lifestyle and also permit environmental preservation.

(d) The futurists. They are those who observe sustainability through very long-term viewpoint and an almost evolutionary timescale (Byrch *et al.*, 2009). Futurists regard humans as being dependent on nature, but also as 'species' that may or not survive the remote future.

(e) The individualists. They represent those believing that society has all the right to exploit the environment for better lifestyles. They see the environment as resources to exploit.

The following Hypothesis is made based on the preceding review of literature:

$H_3$4: Organisations use their employees to promote sustainability among staff

Lizuka (2000) argues that although the public is increasingly concerned about the environment, many people are not taking environmental action. Spash

(2009) makes a similar remark and observes that, although environmental issues have gained in popularity, such popularity has not necessarily translated into serious engagement even from the most hopeful sources. Few attempts to justify the (lack of pro-environmental) behaviours of citizens/employees are given by academics. These consist of:

(1) Arguments that lack of clear information as to what alternatives are available to the public for environmental protection (Lizuka, 2000: 29). Stern (2000) states that it is very often the case that an individual is unaware of his/her environmental negative actions, thus affecting his/her behaviour. For example, Lizuka (2000) points out that the average citizen has a general knowledge that paper is made from trees and that consuming too much will result in increased deforestation. However, such citizens lack information as to what type of paper is recyclable, and where it can be recycled. Another example could be that consumers might lack information concerning the manufacturing process of products (thus their environmental impact) and then they will not be able to know which product (with lesser environmental impact) to choose.

(2) Affirmations that difficulties in distinguishing one's (environmental action) impact on the ecosystem can affect behaviour (Lizuka, 2000). Stern (2000) makes a similar assertion by stating that difficult behaviour can affect behaviour. For example, with reference to Lizuka (2000), the average citizen will find it difficult to establish a link between his/her decision to reduce meat consumption and forestry protection. Another example could be the fact that

reducing car usage in suburban areas, which leads to dependence on public transport, may be deemed unacceptable by some.

(3) Assertion that income can constrain environmental action (Stern, 2000). For example, insulating a property can be seen as a financial burden then leading to environmental inaction. Another example commonly given is that people with lower incomes do have other priorities than to be concerned about the environment.

(4) Claims that old habits and routine which are hard to change are determinant factors in environmental inaction (Stern, 2000). This assertion is based on the idea that past behavior is the best predictor of future behavior (Ajzen, 1991; Bamberg *et al.*, 2003). Ajzen (1991) developed the theory of planned behaviour which predicts the occurrence of a specific behaviour (provided such behaviour is intentional). Ajzen (1991) argues that three specific variables (attitudes, subjective norms and perceived behavioural control) predict the intention to perform a behaviour. Moreover, intentions are the precursors of behaviour in an individual. Therefore, people with certain intentions and beliefs will continue to ignore environmental issues. Graybiel (2005, in Cathryn, 2005) also established that habits influence daily life and routine, and they help to eliminate the need to plan and strategize. Graybiel states that bad habits can have a vice-like grip on both citizen's minds and behaviours and they are hard to break. In fact, Graybiel (2005, in Cathryn, 2005:1) asserts that once individuals develop a habit/routine, they simply "run on autopilot". To illustrate, Graybiel cites a common situation in which an individual trying to lose weight can reset all the good intentions he/she has

previously taken just at the sighting of a piece of chocolate cake. On the same line, Cegarro-Navarro *et al.* (2010) have come to the conclusion that old habits and routine which they referred to as 'old knowledge', have negative environmental impacts in the Spanish hospitality companies.

(5) Statements that lack environmental actions are due to people not been environmentally educated, thus being unaware of the implications of their actions upon the environment (Coyle, 2005). Coyle (2005) argues that currently, what is regarded as environmental education in various literature or programmes tends to be environmental information, but that information merely makes one aware of a topic and very often does not lead to action.

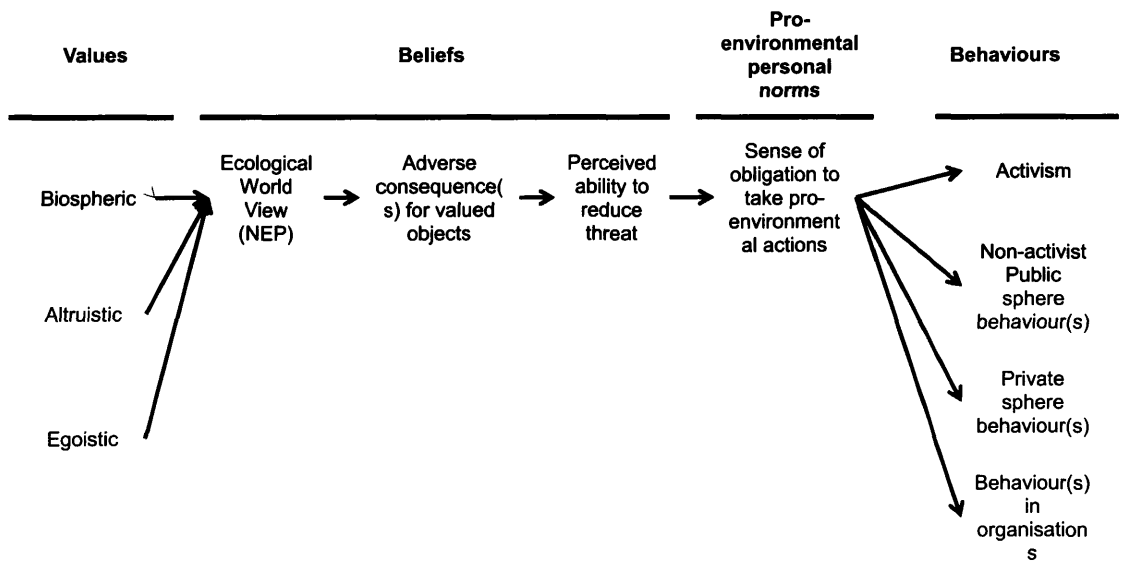
(6) Peoples' belief that their small individual sacrifices for environmental improvement will not result in significant improvement could be a contributing factor (Coyle, 2005). As stated earlier, Eurobarometer (2005) established that a large number of European citizens thought that although they were taking pro-environmental action, they did not see how it would benefit the planet. This could eventually lead to individuals renouncing to take pro-environmental actions. This argument can also be linked to Lizuka's (2000) assertion that people find it difficult to evaluate their environmental impact on the planet ecosystems. The preceding leads to the following Hypothesis ***$H_3$5: Sustainable organisations have a better reputation and image among their employees***

Based on the aforementioned, Stern (2000: 412) developed the 'Value-belief-norm' (VBN) which aims at reversing the negative environmental behaviour

and to achieve environmental awareness. The VBN theory of environmentalism links the new environmental paradigm through a succession of five variables leading to behaviour (see Figure 3.4). Moreover, the theory is based on the postulation that elements such as personal moral norms are the foremost foundation for pro-environmental action in any person (or community). Other affects included individual (community) values which Stern (2000: 414) regards as being a determinant component of 'pro-environmental personal norms' activities. Stern (2000) states that values can negatively influence environmental actions (referring to them as self-enhancement values, egoistic values), and can also (negatively) influence pro-environmental norms and actions. Moreover, Stern (2000) recognises that interactions between values effect on behaviour are not yet well comprehended, and that such interactions may be determinants when analysing individuals (or communities) opposition to environmental management. Following values, Stern (2000) lists (individual or community) beliefs as an important element of VPN. Indeed, it has been established that beliefs have a direct influence on (individual or community) environmental behaviours (Stern, 2000). Such beliefs include (i) whether or not environmental conditions have repercussion on people or thing (Adverse consequences for valued objects), (ii) whether or not personal actions could improve environmental hazards or threats to valued persons or things (Stern, 2000: 414). Thus, Stern (2000) concludes that people or communities with higher ecological value (just as altruists care more about health hazards resulting from environmental issues) will take proactive environmental actions. This calls to mind Kates *et al.*'s (2005) as well as Leiserowitz's (2006, 2007), view that public environmental risk perceptions can fundamentally influence environmentally friendly behaviour. Accordingly,

focussing on the risks of environmental damages (i.e. health issues, threats for futures generations, ecosystems destruction) can be crucial as telling people (environmentalists as well as non-environmentalism) about the risks which can directly affect them (i.e. health issues) can help secure their (or organisations) participation in the 'fight' for environmental management (Stern, 2000). Stern concludes that VBN theory act as a reliable 'forecaster' of environmental behaviour (see Figure 3.4 for more details) compare to other theories.

Figure 3.4 Schematic Representation of Variables in the VBN Theory of Environmentalism



Source: Stern: (2000:412), Towards a coherent theory of environmentally significant behaviour, *Journal of Social Issues*, Vol. 56. Issue No.3.

The aforementioned highlights the importance of organisations in the 'fight' for sustainability. Indeed, organisations have the most impact on the environment; and turning organisations 'green' implies achieving awareness among its staff (Hutchison, 1992; Goldstein, 2002). Nevertheless, as developed throughout this chapter, environmental awareness is also shaped

by national and community influences (Lizuka, 2000; Schreiner and Sjøberg, 2003; Ko *et al.*, 2011) (see Figure 3.5). For instance, elements such as national culture and education, community traditions and beliefs, as well as socio-demographic factors can shape employees' cultures and values, perceptions, attitudes and behaviours towards the environment (Guagnano, 1995; Lizuka, 2000; Vorkinn and Riese, 2001; Nielsen *et al.*, 2003; Todd *et al.*, 2006;Harris, 2006; OECD, 2007; Hunter *et al.*, 2010;). This in turn has an impact on environmental behaviour as shown on Figures 3.5 and 3.6 (Stern, 2000; Casimir and Dutilh, 2003; Ziadat, 2010). Moreover, employees' environmental actions can positively or negatively influence their organisations' impacts on communities and/or the environment (Stern, 2000; Wellcome Trust Centre for the History of Medicine, 2004). Furthermore, communities can respond by influencing political decisions through various actions (i.e NGOs, protest, legal actions, etc) as seen in many reviews (Cutter, 1995; Kaswan, 1997; Stephens *et al.*, 2001). Also, political decisions are commonly based on economic objectives as well as national environmental concerns (Colby, 1991; Adams, 2006). Political responses (action or inaction) have a direct influence on organisations nationwide (Colby, 1991). Therefore, this study presents in Figure 3.5 and 3.6 a resume of the possible interactions of all the cited elements which lead to employees' environmental awareness which will be tested in this study. Moreover, the following two Hypotheses are made:

$H_3$6: Environmental facilities available at work and environmental activities conducted at workplaces for the enhancement of environmental awareness of employees are sufficient

H_37: There is a correlation between environmental facilities and activities available at organisations' workplace and their employees' environmental awareness.

Figure 3.5 - Environmental Awareness Development Framework

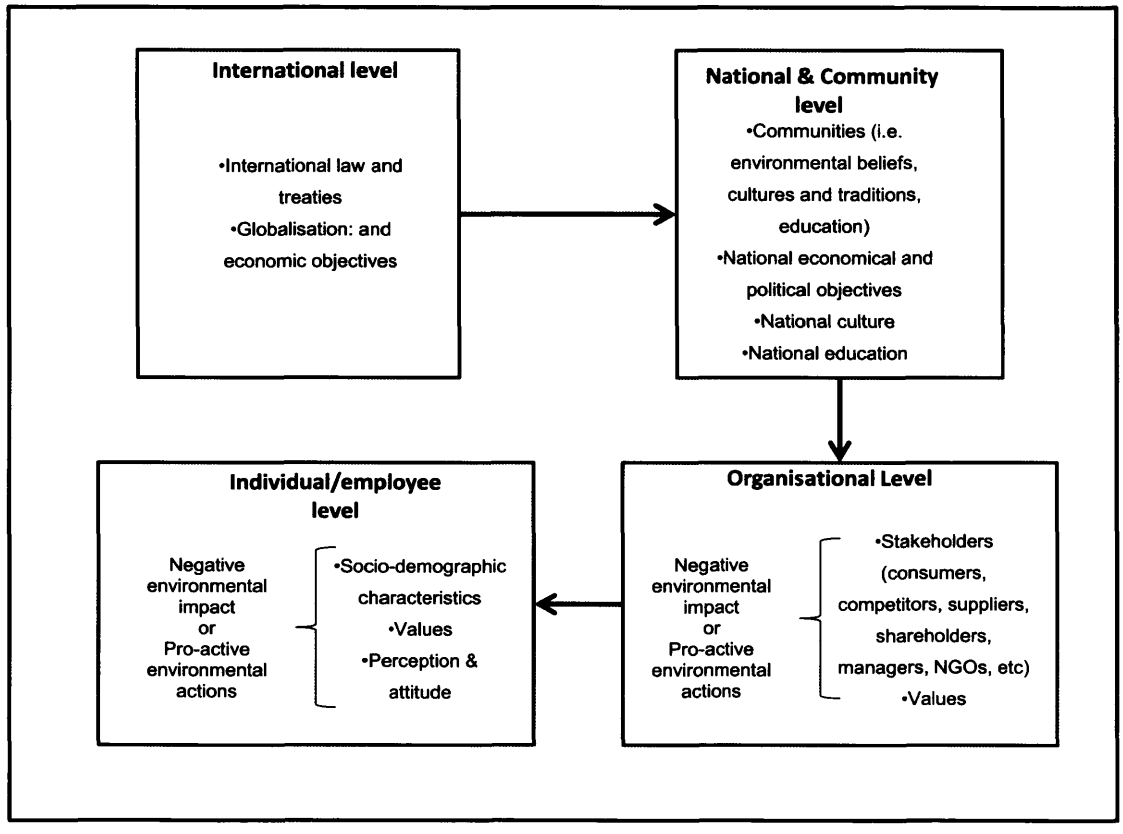
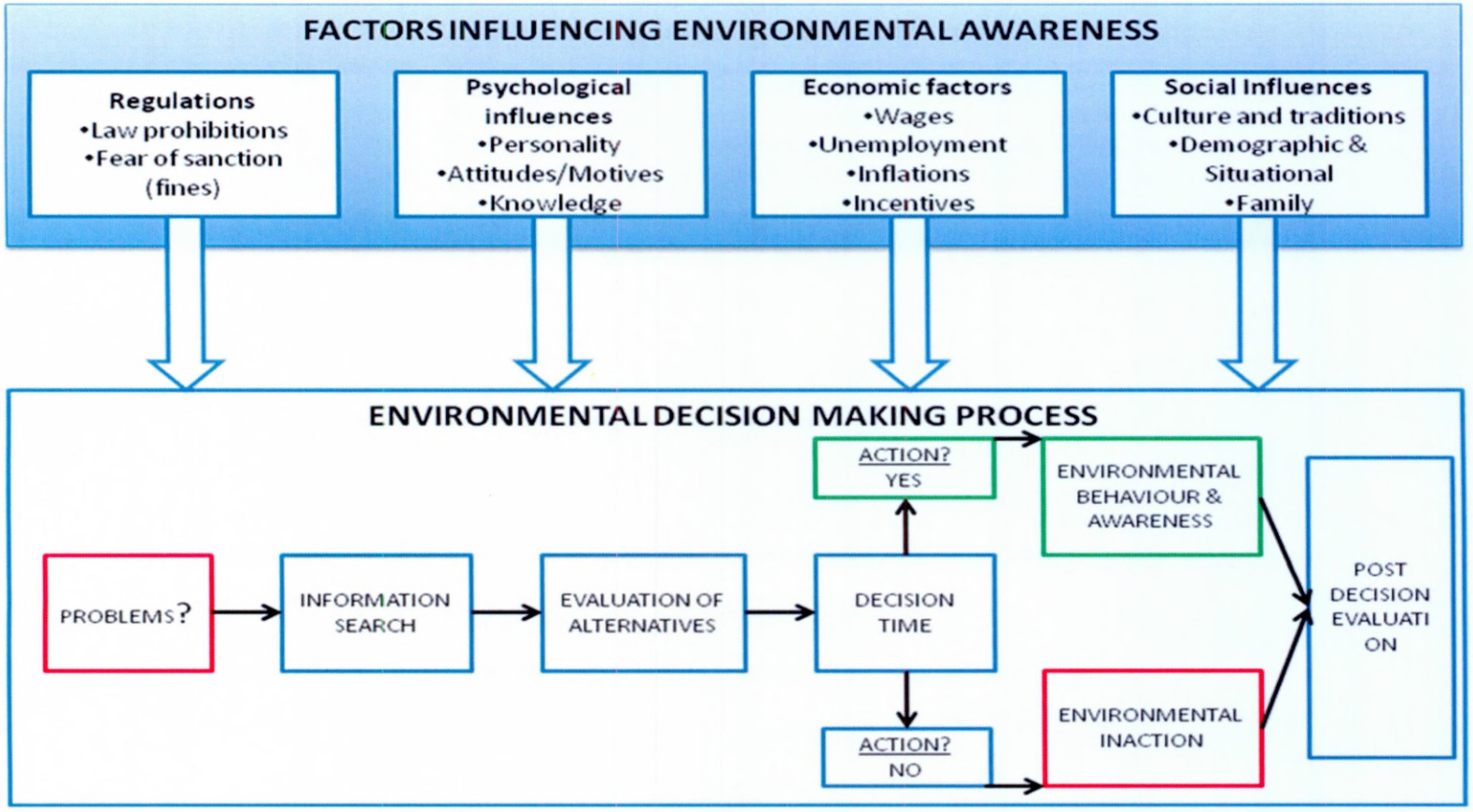


Figure 3.6 - Factors Affecting Environmental Awareness



Sources: Adapted from Dibb and Simkin; *Marketing Briefs: A revision and Study Guide*; 2001: 31)

3.5 CONCLUSION

The foregoing review of literature confirms the importance of environmental awareness in achieving sustainability. It can be concluded that that at organisational level, pro-environmental behaviours can be affected by external forces (government regulations; community, NGOs actions) and by internal forces (shareholders and owners, employees). Moreover, at employee level, environmental behaviour is the end result of a process involving (i) individual (or community) perception of outcome (costs and benefits) of particular actions on the environment; (ii) individual (or community) beliefs and norms; (iii) personal aptitude such as knowledge and skills (i.e. knowing which products are environmentally friendly), (iv) general components and resources (i.e. wealth, literacy, social status), and (v) socio-demographic factors (age, education, gender, income). Thus, successful environmental solutions necessitate a mixture of governmental intervention (trough legislation and law enforcement), the involvement of the whole society (i.e. recycling at home), and the participation of organisations operating both at national and at international level. This outcome of this review of the literature is presented in Figures 3.5 and 3.6 which show the (possible) interactions of all influential elements that lead to employees' environmental awareness. The following chapter will be dedicated to the methodological approach the study will adopt in order to test the formulated hypothesises.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1. INTRODUCTION

The purpose of this chapter is to delineate the research methodology, in order to help guide the way in which this thesis approached and dealt with its issues. It is to justify the research design and process used within the programme of study, in order to meet its aim and objectives. The chapter provides a brief literature review, in order to seek to defend the adoption of a positivist paradigm, and to provide a step-by-step account of how the study was conducted. As such, the chapter covers nine sections structured as follows: section one presents and discusses the philosophic position of this research, and its implication for the research methodology undertaken. Section two presents the existing research approaches, and justifies the selection of a deductive reasoning, as well as the adoption of a quantitative approach. Section three reviews the major research strategies including survey research, archival research and case study research with the aim of selecting an adequate and compatible strategy for this study's research objectives. In section four, the chosen design for the questionnaire is explained. This includes the 'refining' of the needed information with regards to this study, the selection of a questionnaire type, and the elaboration of the

questionnaire's structure and layout. The feasibility study and the initial reliability assessment are presented in section five with a presentation of the pilot study undertaken. Section six reveals the sampling strategy adopted for this research, while in section seven the issue of the reliability and validity of this research is discussed. Section eight presents the process adopted for the data processing and analysis. Issues such as data entry and coding scheme are also explained. Finally, section nine presents the ethical concerns that the research faced as well as steps adopted to achieve non-questionable ethical practice. The chapter ends with a short conclusion.

4.2 RESEARCH PHILOSOPHY

Research is a systematic investigation, a detailed study, in order to establish facts, to discover new information or to reach a new understanding on a specific subject (Cambridge Dictionary, 2013). Based on this definition, the researcher regards the study he is carrying as the art of being able to undertake scientific investigation given that research is "best conceived as a process of arriving at dependable solutions to problems through the planned and systematic collection, analysis and interpretation of data" (Mouly, 1978:12).

This study seeks to fulfil the following objectives: (i) to demonstrate how employees' environmental awareness and behaviour differs according to their socio-demographic characteristics (i.e. gender, age, parental status, education level, income); (ii) to investigate organizations' environmental awareness and

actions, as well as factors influencing organisations' environmental decisions (including potential difficulties); (iii) to evaluate the environmental actions of organisations, and to determine if organisations' environmental policies influence employees' environmental knowledge and behaviour; (iv) to identify ways of how to improve and promote environmental awareness in the workplace; and (v) to make recommendations for the improvement of environmental awareness and behaviour and hence environmental management in organisations. Hence, it is important for this study to select and adopt a research philosophy because determining a research philosophy is paramount for any social sciences researcher (Kothari, 2004; Johnson *et al.*, 2007; Easterby-Smith *et al.*, 2008). Research philosophy refers to the ability of the researcher to consider the world and to underpin a research strategy and method (Saunders *et al.*, 2009).

With regard to conducting research, there are two means of doing academic research analysis: quantitative and qualitative approach. Both research methods included various paradigms (Stiles, 2001) which are regarded as the outcome/result of scrutinizing the development of a specific area of knowledge (Vasilachis de Gialdino, 2009). Moreover, according to Saunders *et al.* (2009: 129) paradigms regroup what represents non-refutable knowledge in a specific field of study. In essence, a research paradigm consists of three fundamental and interrelated components (Guba, 1990; Guba and Lincoln, 1994; Easterby-Smith *et al.*, 2008; Vasilachis de Gialdino, 2009). It is known that the notion of paradigm cannot automatically be applied to other areas of research; hence thinking about a single epistemology for all scientific disciplines will be a mistake (Vasilachis de Gialdino, 2009). Therefore,

understanding the difference in epistemology among paradigms is the primary objective in philosophical research (Krauss, 2005). Undeniably, in conducting research, using different paradigms, which give different answers to epistemology's question(s), is a necessity as paradigms have their own criteria and their own underlying views for research designs (Vasilachis de Gialdino, 2009). With that in mind, a review of research methodology literature reveals that numerous paradigms exist. In fact, it is difficult to give an exact number of existing paradigms (and the names associated with a paradigm) as they vary from one author to another (Willis, 2007). Nevertheless, it is commonly accepted that most paradigms and associated names can be regrouped into three main paradigms: positivism; interpretive; and critical theory (Willis, 2007). A brief review of these research paradigms is given below.

(a) Positivism

Positivism is regarded by Krauss (2005) as the predominant paradigm in social science. Kaboub (2008) states that a paradigm enables 'real events' to be observed empirically. Hence, it enables the explanation of such events with a logical analysis. Positivist researchers usually make scientific theories. They have a propensity to use questionnaires for collecting their data and use tools such as random sampling, hypothesis testing, and aggregation for statistical analysis (Stiles, 2003; Straub *et al.*, 2004).

(b) Interpretive approach

Interpretive approach is the opposite of the positivism paradigm. It focuses on subjective aspects of human activities. Advocates of the interpretive approach "adopt the position that our knowledge of reality is a social construction by

human actors" (Walsham, 2001: 376). Under this paradigm, researchers acknowledge that they (as well as all respondents involved in their study) will have their own interpretation of the constructed world (thus being influenced by their attitudes, values, and cultural assumptions) regarding a research situation (Mackenzie and Knipe, 2006; Hammersley, 2009; Vine, 2009).

(c) Critical theory

Although positivism and the interpretive approach are the predominant paradigms in social research, critical research theory is also used (Willis, 2007). A researcher's objective is to challenge values as well as interpretations with the purpose of effecting a change (Vine, 2009). A critical researcher's aim is to go beyond assimilated experience in addition to his/her aims to demonstrate how knowledge's construction and the society's ways for organising power can lead to the subjugation of particular individuals, groups or perspectives (Reeves *et al.*, 2008; Kincheloe and Mclaren, 2011). Besides, Reeves *et al.* (2008: 632) note that this paradigm is not "tied to a specific methodology and could be applied at the micro (individual), macro (local system and contacts), or macro (societal) level."

In this research, the aim and objectives of the study is to investigate the role of socio-demographic factors on employees' awareness and behavioural responses to sustainability issues. On that basis, the researcher believes that the positivist paradigm (Krauss, 2005) is appropriate as a research philosophy for this study. The decision is based on the following elements:

(i) Positivists believe that scientific methods and practices can be applied to behavioural and social studies, and to scientific theories relating to environmental management, as a way of understanding social and psychological phenomena (Sharpley and Telfer, 2004; Saunders *et al.*, 2009);
(ii) The current research attempts to investigate the relationship between organisations' employees' knowledge, and environmental actions, and their socio-demographic factors within the United Kingdom, rather than attempting to deeply investigate relevant issues. Therefore, an objective attitude is considered as a necessity for this research (Easterby-Smith *et al.*, 2008).
(iii) Positivism focuses on the use of scientific and structured methodologies, and it enables the collection of quantifiable data (Saunders *et al.*, 2009) via the use of questionnaires (Stiles, 2003), as well as enabling the use of statistical analysis tools for analysing the data (Straub *et al.*, 2004).

Having chosen a paradigm for this research, it is important to elaborate its research approach (Saunders *et al.*, 2009). In order to do so, the following section provides a brief review of the leading research approaches in social sciences.

4.3 RESEARCH APPROACH

Easterby-Smith *et al.* (2008) as well as Saunders *et al.* (2009) state the importance of adopting an appropriate research approach (after choosing a philosophical paradigm) as an efficient strategy to increase the validity of a social research paradigm. In social research, researchers often refer to two

broad reasoning approaches known as the deductive and the inductive approaches (Anderson, 2004).

4.3.1. Deductive approaches

A deductive approach can be defined as a study that "involves taking a proposition that is thought to be true and testing it out in different situations" (Anderson, 2004:102). Saunders *et al.* (2009) state that the approach requires the elaboration of a research strategy to test the hypotheses associated to an existing theory. Hence, the approach requires that "a process of logic is applied to something that is thought to be true, than a theory that must be derived, and the theory that is tested out in an empirical way in different situations, conditions and contexts" (Anderson, 2004:102). This process is also known as moving from the general to the specific, or a 'top-down approach' (Burney, 2008). With the deductive approach, the testing of the theory (ies) requires the formulations of hypotheses, the gathering of relevant data, the testing of the hypotheses (through the use of scientific methodology), and the outcome of the research which can either confirm or modify the theory (ies) from which the hypotheses were derived (Anderson, 2007). Consequently, it is fair to consider that this approach is in line with the positivism paradigm (Saunders *et al.*, 2009).

4.3.2. Inductive approach

With the inductive approach, a theory is "generated through a process of observation over a period of time and general proposition about the nature of what is observed is established" (Anderson, 2004:102). The inductive approach involves observing and exploring the meaning and action of human

subjects, and the collection of data and the development of a theory resulting from the collected data analysis (Anderson, 2004). Burney (2008) refers to the inductive approach as 'the bottom up approach'. That is because, to the contrary of the deductive reasoning, the approach moves from a specific observation to a broader generalisation (Burney, 2008). Thus, it is closer to the interpretive approach paradigm (Saunders *et al.*, 2009). Furthermore, Anderson (2004) asserts that once a theory is generated through an inductive reasoning, it is possible for such theory to be further developed via an empirical testing method (thus in a deductive way). This explains why Newman and Benz (1998) argue that the two approaches are neithermutuality neither exclusive, nor interchangeable but are interactive tools for research methodology. As a result, Anderson (2004:102) states that both approaches are "rooted in practical reality."

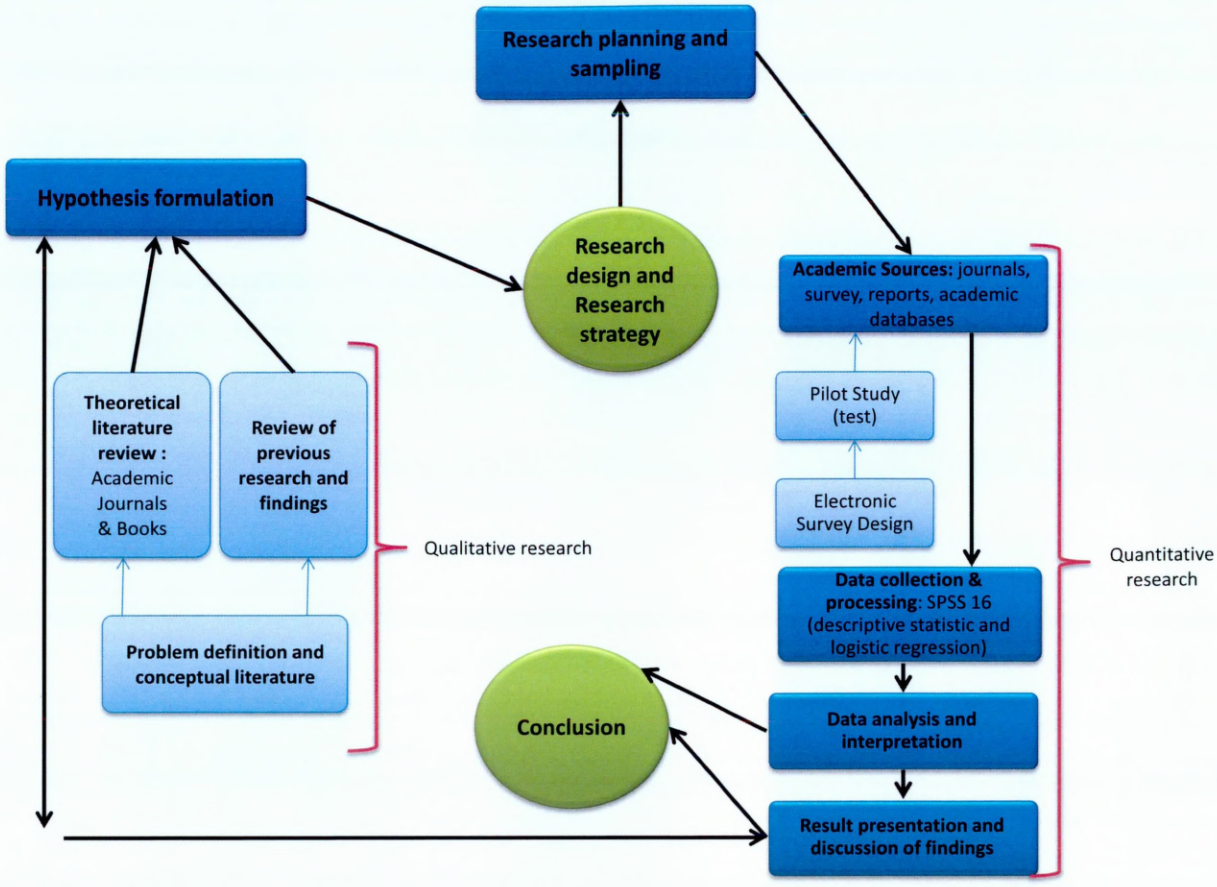
Therefore, coupled with a focus on the research's aims and objectives, a deductive approach is adopted for this study. In fact, this study develops from general ideas and theoretical concepts relating to environmental management. From the studied theories, specific hypotheses are made. Then, the study develops a strategy to collect relevant data. This is done by administrating questionnaire surveys. Finally, this research tests the developed hypothesis. All these steps are in line with the deductive approach.

4.4. QUANTITATIVE AND QUALITATIVE RESEARCH METHOD

Qualitative research is defined by Punch (2005:3) as an empirical research "where the data are not in the form of numbers". Moreover, Strauss and Corbin (1998:10 - 11) consider qualitative research as "any type of research that produces findings not arrived at by statistical procedures or other means of quantification. As for the quantitative research, Denzin and Lincoln (2008:8) state that it is a method focusing on "the measurement and analysis of causal relationships between variables, not processes ". Punch (2005:3) considers quantitative research as empirical research "where the data are in the form of numbers". The fundamental differences between the two methods is that the qualitative research focuses on the development of theory via non-numerical data and constructivism (Easterby-Smith *et al.*, 2002); while quantitative research tests theory via numerical data and a positivism paradigm (Denzin and Lincoln, 2008).

Based on the preceding review of qualitative and quantitative research, this study adopted quantitative approach because it (i) follows a positivism paradigm and a deductive approach; (ii) facilitates the survey of large group of population within a relatively short time frame (see Figure 4.1 in the following page); and (iii) advocates for the gathering of numerical data and the use of scientific analysis for the testing of hypotheses. This research has also used academic journals and books, as well as academic databases during the theoretical analysis to generate some qualitative data.

Figure 4.1 - Research method process and the different phases of activities



Source: Adapted from the Ünal S. and Coștu, B. (2005: 5), Problematic issue for students: Does it sink or float?, *Asia-Pacific Forum on Science Learning and Teaching*; Vol.6, Issue No.1, Article.3

4.5 PROCESS OF DATA COLLECTION

Having adopted a quantitative research method for conducting this research, a survey research method is adopted as the most appropriate way of collecting data for this research (Gable, 1994). Another reason is based on Kelley *et al.*'s (2003) statement that a survey research uses the following methods: descriptive research (based on the examination of an event through the description of important factors which are associated with the event); analytical studies (based on the assessment of a situation through a focus on

data analysis, by examining the effects of one set of variables upon another set); and evaluation research (which focuses on data collection to determine the effect of a projected change). Indeed, this study aims at investigating the environmental awareness of organisations' employees. As such, the research topic is not analysed under a unique or specific prism, but it is more about analysing possible relationships and trends between variables such as socio demographic factors (e.g. gender, age, economic, etc) and the sampled population's environmental awareness.

To conclude this part, as shown in Figure 4.1, this study followed various stages which included:

(i) the design of the questionnaire;

(ii) the feasibility study;

(iii) the sampling strategy;

(iv) the distribution of the questionnaire;

(v) the analysis of the data

At each stage explained below, the researcher made sure the validity of the research was unquestionable as in the field of social sciences, it is largely accepted among researchers that the notion of validity represents an essential aspect of any research (Huberman and Miles, 2002: 41).

4.5.1 Questionnaire design

Based on the principles of survey research strategy, elements such as the validity of the data, the financial cost and time constraints were taken into consideration during the questionnaire design (Kelley *et al.*, 2003). One of the

study's aims was to investigate employees' perception, knowledge, awareness and attitude toward environmental concerns. The survey design necessitated also an exploratory research aiming at clarifying what information was needed and to make sure that the collected information was relevant to the research questions, and were ethically acceptable. Naumann and Giel (1995) assert that the purpose of a questionnaire is to capture the respondents' attitude toward various attributes of services. In social sciences, questionnaires must be designed in a way that complies with a set of principles (Gendall, 1998; Kelley *et al.*, 2003). These are:

(a) A covering letter which all respondents should get must be added. The letter aims at encouraging the sampled population to take part and also to meet the requirements of informed consent (Kelley *et al.*, 2003). With this research a letter was prepared with the questionnaire. It included the researcher's name, address, contact details, the organisation of study, the aim of the research, and information regarding the handling of the collected data.

(b) The Needed Data/Information. The needed information must to be translated into "good questions" which are questions that will produce reliable answers as well as valid measures of a phenomenon a researcher would want to elucidate (Fowler, 1995; in Gendall, 1998, p.7). In terms of information regarding the respondents' behaviours, the present research uses Bagozzi and Burnkrant's (1979) as well as Francis *et al.*'s (2004) principles for the measurement of attitudes and behaviour as they are easy to translate into data for statistical analysis. Besides, in order to measure environmental attitude and awareness, aggregate response to 'the 7 points Likert scale'

(environmental) questions were employed (Bagozzi and Burnkrant, 1979). Likert scale questions are the most widely used research approach for scaling surveys' responses (Hustler, 2005; Amis and Silk, 2008; Saunders *et al.*, 2009; Gravetter and Forzano, 2012). It enables the respondents to express their 'agreement' or 'disagreement', or their 'extreme satisfaction' or 'extreme dissatisfaction' over a statement, or regarding a particular issue (Saunders *et al.*, 2009).

(c) Selecting the type of questions. The questions' wording must be simple, concrete, and short. The respondents' involvement should also be secured to ensure that they do complete the questionnaire. Although for this study's questionnaire multi-choice questions are used, from a general perspective, closed-ended questions are also adopted. The decision to adopt closed-ended questions was based on the fact that the researcher adopted a quantitative approach. Moreover, this study aimed at getting as many respondents as possible to complete the questionnaire. With such objectives, Babbie (1991, 2007) recommends closed-questions because they are easy and quick to complete, thus increasing the rate of return (completed) questionnaires. Also, this option facilitates the analysis of the numerical data compared to the open-ended data. However, Reja *et al.* (2003) note that closed-ended questions can lead to bias. So, to reduce any potential bias, focus groups were organised during which questions were tested and modified when appropriate.

(d) Sequencing and wording of questions. In this research, the researcher adopted clear, simple and short sentences. All questions focused on the objectives of the study, and no difficult terms were used in phrasing the

questions. With regard to the structuring of the questions (sequencing), the researcher ensured the questions flow from each other in a logical way. Moreover, the researcher grouped together questions under common headings with the objective of helping the respondents to contextualise the subsequent questions (Adams and Cox, 2008). This was particularly important as badly sequenced questions can de-motivate respondents from answering (Reja *et al.*, 2003). Also, embarrassing questions were avoided, sensitive questions were placed at the beginning of the questionnaire, while request for biographic information such as contact details were placed at the end of the questionnaire, as recommended by Frazer and Lawley (2000).

(e) Questionnaire structure. The questionnaire layout, format and graphic design should be designed to make the respondents' task easier. In this research, the questionnaire started with an introduction message, which introduced the researcher, his research topic, and confidentiality issues (see Appendix G). The questionnaire was divided into five sections (see Appendix H) as follows:

- Section 1 comprised nine (9) questions aiming at collecting the respondents' personal background and socio-demographic elements. As such, nominal scales were applied to classify the respondents according to their gender, age, educational level, parental status, employment status and job title, and sector of activity. This section help to address Hypotheses:

  $H_2$2: There is a correlation between Environmentally Aware and people's social status; and

$H_3$3: There is a correlation between socio-demographic variables and people's environmental awareness;

- Section 2 consisted of a set of eighteen (18) questions, all aimed at evaluating the respondents' environmental behaviour at personal level. The section gathered the respondents' environmental behaviour and consisted of questions related to their recycling habits. For instance, all respondents were asked whether they smoke, cycle, use public transport, recycle at home and what they recycle. As such, the section played a primordial role in the collection of data for testing Hypotheses:

  $H_2$1: An individual with good environmental knowledge will take pro-active environmental actions, and

  $H_3$2: Organisations' employees are environmentally aware.

- Section 3 consisted of seven (7) questions which attempted to evaluate the respondents' knowledge of general environmental issues. Some of the questions included sets of multiple-choice questions on contemporary environmental problems, as well as statements which, respondents had to establish whether they were true or false following Francis *et al.*'s (2004) "true – false" scale principles to measures respondents' environmental knowledge. Environmental knowledge has been an important element of environmental awareness; hence this section provided the data for the testing of Hypotheses:

  $H_2$1: An individual with good environmental knowledge will take pro-active environmental actions;

$H_2$2: There is a correlation between Environmentally Aware and people's social status;

$H_3$2: Organisations' employees are environmentally aware;

$H_3$3: There is a correlation between socio-demographic variables and people's environmental awareness; and

$H_3$7: There is a correlation between environmental facilities and activities available at organisations' workplace and their employees' environmental awareness.

- Section 4 comprised a set of fifteen (15) questions assessing the respondents' workplace environmental awareness. The 7-points Likert scale was used to determine employees' organisations' environmental actions as well as employees' behaviour at their workplace. The collected data help to test the Hypotheses:

  $H_3$6: Environmental facilities available at work and environmental activities conducted at workplaces for the enhancement of environmental awareness of employees are sufficient;

  $H_2$1: An individual with good environmental knowledge will take pro-active environmental actions;

  $H_3$2: Organisations' employees are environmentally aware.

- Section 5 had eight questions which aimed at measuring the respondents' perception and behaviour towards their organisation's environmental action(s). Bagozzi and Burnkrant's (1979) instrumental items as well as 7-point Likert scale questions were applied to assess the respondents' perception regarding their workplace environmental

policy and actions. The collected data help in the testing of the following Hypotheses:

$H_3$1: Environmental regulation is the main reason why organisations adopt sustainability practices;

$H_3$4: Organisations use their employees to promote sustainability among staff;

$H_3$5: Sustainable organisations have a better reputation and image among their employees; and

$H_3$7: There is a correlation between environmental facilities and activities available at organisations' workplace and their employees' environmental awareness

(f) Questionnaire layout and administration. A decision to digitalise this research questionnaire was taken in order to achieve data processing efficiency. The choice of 'web surveying' was not without risks. Thus, it was imperative for this research to adopt a design which maximises the completion of the questionnaire by the respondents. This involved two stage planning. At first, the questionnaire was entirely designed through Word, a Microsoft Office application. In order to maximize the response rate, precautions were taken to ensure the survey looked easy, simple and achievable. The second phase consisted of 'migrating' the Word Document questionnaire into a web survey service provider. Although the digitalisation of the questionnaire presented risks, such risks were avoidable as certain principles were adopted (Reja *et al.*, 2003). These include: (i)ensuring the web survey provider offered good designs and good appearance; (ii) making sure the colours background on the website were based on light pastel colours while the background had a darker

colour to ensure it was contrasting well with the text (which had a font size of 12 and black as font colour) allowing respondents to read easily; (iii) making certain that the survey platform provider enables questions to have 'tick-boxes'; and (iv) making sure options such as gap between questions, numbered pages were available.

To conclude this part, having determined the adequate structure and layout for the questionnaire, the researcher next step was to design a feasibility and reliability study (presented in the section below) with the aim of determining the right questions which would have constituted the survey.

4.5.2 Feasibility study and initial reliability assessment

Altman (2006: 1) asserts that the feasibility study (pilot study) refers to an 'undersized' experiment designed to gather information and to test logistics prior to the launch of a larger study with the objective of improving the latter's quality and efficiency. This study adopted a pilot study as it can expose deficiencies in the proposed research design which (if any) would have been addressed before the researcher invested time and resources on the field research (Champion, 1998; Altman, 2006). With this study, the pilot group was made out of ten respondents who helped establish an initial reliability assessment. Originally, a group of eighteen people were contacted by email and telephone right after completion of the first draft of the questionnaire first to obtain their assistance. Those who agreed to participate (ten in total) were re-contacted again by personalised facsimile (see appendix F) to confirm their acceptance to participate, and to transmit them the relevant information

regarding the dates, place and time during which the focus group meeting was set (as recommended by Morgan, 1998).

The focus group revealed some advantages. It gave the researcher the capability to utilise non-verbal behaviour as part of his study input. As such, the researcher was able to draw upon respondents' attitudes, feelings and beliefs and reaction with regards to the questions they were asked. Furthermore, given that the research's respondents were from different socio-demographic backgrounds, the focus group enabled the researcher to measure, where appropriate, consensus on a given environmental question. It also helped the researcher during some of the hypotheses formulation (i.e. especially concerning the possible socio-demographic difference with regards to environmental awareness). Moreover, important issues such as what constitutes a 'green' behaviour at the workplace, what problems environmentally aware respondents faced at their workplaces - were drawn with the help of the group. Also, it helped shed some light on the potential problems which the researcher was likely to encounter when conducting the main study. For example, question 29 of the questionnaire was re-phrased to make it clearer and easier for respondents to understand. Moreover, potential ambiguities and confusion between questions of section 2 of the questionnaire were also corrected.

Prior to distributing the questionnaire, the researcher had to adopt a sampling strategy. Virtually, all sample strategies are complex because of their stratified and clustered features (Turner, 2003; Babbie, 2007). As such, a review of the

major sampling strategies is presented in the following section prior to selecting an appropriate sampling process for this research.

4.5.3 Sampling process

One of this study's aims focused on the respondents' particular characteristics (i.e socio-demographic elements) which were deemed appropriate for answering the research questions. As a result, it was imperative to determine an adequate sample size. Sandelowski (1995: 179) states that determining adequate sample size is fundamentally a matter of "judgment and experience". Yamane (1967: 258), however, proposes an estimation formula for determining the correct sample size of a research. This formula is presented below:

$$S_z = \frac{N}{1 + (N)(e)^2}$$

S_z is the required responses/the sample size
e^2 is the error limit (recommended by Turner (2003) to be set at 10%)
N is the sample size/population size

Moreover, for all researchers, finding results that can apply to an entire population is utmost important. Therefore adequate sampling process is needed. Turner (2003) and Landreneau (2005) state that there are two major sampling strategies. The first one is the probability sampling which is a technique by which elements of the target population (e.g. geographic units, persons, and households) are selected for inclusion in the survey (Turner, 2003) and it consists of a selection process in which each element of the sample population has a known mathematical (equal and independent) chance of being selected (Landreneau, 2005; De Boni *et al.*, 2012). The second one is the non-probability sampling which is less likely to produce representative samples in contrast to the probability sampling (Landreneau,

2005). That is because there is no statistical theory to channel the use of non probability samples. Therefore this strategy can only be measured through subjective evaluation (Turner, 2003). Major statistical governments' agencies have adopted probability-based strategy over non-probability samples (Doherty, 1994). Most researchers carrying quantitative research also adopt probability sampling strategies (Chao, 2012; De Boni, 2012).

Furthermore, Bryman and Cramer's (1990: 98) argue that during the sampling stage, a researcher will rarely find or have sufficient resources as well as time to conduct his/her research. In recent years, cluster sampling has broadly been used in research (Turner, 2003). That is because a cluster technique is adequate for studies in which the researcher is incapable of obtaining a complete list of the members of the population he/she wishes to study. The sampling process involves selecting a group or cluster (e.g., by institution) from the total population eligible for the study (Easton and McColl, 1997; Turner, 2003).

With this study (as with any), it was impossible to collect data from the entire population. Thus, the data was collected from a sample of the target population (Huberman and Miles, 2002; Field, 2005; Altman, 2006). Consequently, probability sampling was applied because it gave every member of the population a known chance of being selected and included in this research sample; and, this sampling method meant the sampling process was free from personal bias, plus it was the most suitable for studied where the population is small. Hence, this study's eligibility process for the sample population followed three criteria. The first one is that the selected entities had

to be organizations or institutions (i.e. companies, national and/or international agencies, universities, government offices). The second criterion was that the selected organizations had to be located in the United Kingdom. The third criterion was that the targeted the respondents (males and females) had to be employees of the selected organisations.

In terms of the background of the sample, the respondents are composed of 43% males and 53% females. The respondents hold different jobs titles in a variety of industries and sectors of activities ranging from education, medical, finance and more (See Table 5.3 in the following chaper). In terms of population size, this study's sample includes male and female employees of the selected organisations in the year 2012. Based on Yamane's formula, the researcher calculated this research acceptable required response ($S_z = 99.99$) which would be the smallest acceptable number of questionnaires to preserve a 95% confidence level and a 10% error level (Yamane, 1967; Turner, 2003). With this figure in mind, contacts were established with organisations either by directly visiting organisations offices, emailing and/or telephoning, or via acquaintances he had in some organisations. A total of 60 organisations were contacted for the purpose of this research (see Appendix E). However, only seven organisations (11.67%) agreed to participate. Most of the participating organisations had offices across the country and the researcher estimated that if grouped together the organisations had over 10000 employees. The sheer quantity of potential questionnaire responses seemed promising. Overall, 300 digitalised questionnaire links were sent by email to the employees of the participating organisations. All copies of the sent questionnaires included a note stating that a Microsoft Word version was also

available if required. None of the respondents requested a Microsoft Word copy of the survey. The digitalisation process made the collection and data entry process easier as each time a questionnaire was completed, it was automatically added to the database.

4.5.4 Questionnaire Distribution and Data Collection

Survey questionnaires can be completed either by respondents themselves (self administered) or by an interviewer (interviewed-administered questionnaire). Each survey administration approach has advantages and disadvantages. For instance, with regard to the self-administered questionnaire, it is considered by researchers as being cost effective (Saunders *et al.*, 2009) given that it is often mailed to the respondents. Moreover, it provides the respondents with privacy which could be suitable for sensitive questions (Koponen *et al.*, 2011). However, Koponen *et al.* (2011) state that this method is based on the assumption that respondents are not virtually impaired and have a good literacy level. Moreover, this method can lead to low return rate (Saunders *et al.*, 2009) and any researcher using it might miss relevant information. In contrast, the interview method is considered as costly and time consuming (Koponen *et al.*, 2011) but the return rate is often higher because it eliminates the issue of literacy and visual impairment, and it provides the researcher with the possibility to obtain clarifications from respondents.

With regards to the responses rate, this research aimed at achieving a good response rate. As such, the researcher attempted to uncover what constitutes an acceptable response rate in social research. Various studies described

their response rate as 'acceptable' at 16.6% (Gadenne *et al.*, 2008). Kelly *et al.* (2003) assert that researchers using questionnaires should expect an average of 20% response rate depending on the content and length of the questionnaire. Obviously, a high response rate means less chance of significant non-responders bias than does a low rate (Watt *et al.*, 2002; Nulty, 2008; Yehuda and Holtom, 2008).

In this study, the researcher considered that offering anonymity would have guaranteed the preservation of the respondents' respect, and respondents would have not felt embarrassed if asked environmental questions they did not know, especially in the presence of the researcher. Also, the researcher wanted to allow respondents to fill in the questionnaires at their own time without the need to rush or stress. Another requirement with this research was the need to limit cost as well as to save time. Therefore, the self administered questionnaire was considered the most appropriate method for this study.

Specifically, of the 300 questionnaires distributed to owners/managers/employees of organisations, the number of responses totalled 101 (33.66% response rate). About 44% of the respondents were males and 56% were females. After reviewing the returned questionnaires, only 83 of the total responses were considered valid for the research as 17 questionnaires were completed by employees working outside the United Kingdom. This was probably due to the fact that some of the organisations had operations abroad. The response rate for the questionnaire was established at 27.67%. Furthermore, the researcher was asked to meet with an acquaintance who is a manager of one of the organisations from which he

did not hear back from (and which was located in Edinburgh). The manager gave the researcher 10 printed (and manually completed) copies of the questionnaire. The researcher was also informed that as that manager's organisation dealt with financial matters, they could not have completed the online version for IT security reasons. As such the acquaintance had printed the copy that was submitted to his organisation for approval and asked his staff to fill in the questionnaires. These additional questionnaires were added manually into the database. As a result, the total responses which deemed as valid reached 93 questionnaires. Thus, the response rate for this survey increased to 31% which is satisfactory (Watt *et al.*, 2002; Kelly *et al.*, 2003; Gadenne *et al.*, 2008; Nulty, 2008). The 93 respondents were 40 males (43%) and 53 females (57%).

4.6 DIFFICULTIES ENCOUNTERED DURING DATA COLLECTION

The digitalisation process of the questionnaire generated some challenges. The first electronic version was developed using a free survey service provider called 'eSurveyPro', a product of Outside Software Inc (a Romanian based company). However, during the administration of the survey, problems surfaced. Some respondents reported issues such as questions not appearing, questions not appearing in order, or even entire pages of the questionnaire not been available. In some cases, the questionnaire link was simply not loading up the questionnaire. After unsuccessful attempts to contact the company customer services, the researcher opted for re-designing

the online version of the questionnaire. A decision to opt for a British based company, and also to opt for a 'paid for' service was also taken. After numerous price and service comparisons, 'Free Online Surveys', a UK internet based survey provider (owned and operated by Problem Free Limited) was selected. After weeks of testing the new service provider, it emerged that Free Online Surveys was versatile and offer comprehensive data security. Therefore, the decision to release the new questionnaire was taken. As such, the survey was rolled out on March 12th 2012. Apology emails, and in some cases telephone calls were made to respondents who had either already completed the questionnaire, or received the questionnaire and not completed it yet. All the re-contacted respondents agreed to fill in the questionnaire again.

With regards to the sampled organisations, some of them (Phones4U, SGCIB, Napier University, TERNA) requested a copy of the questionnaire (including university letter) which they sent to their Human Resource Department for approval. Another recurrent difficulty was the 'silence' or no-response from some of the contacted organisations (59%). Eventually, around 29.33% of the organisations contacted, apologised, and rejected the researcher's request.

Another difficulty the researcher faced was getting in touch with the right contacts. This was especially true with Phones4U. Indeed, after weeks of talking to various employees at Phones4U, the researcher did not manage to get an appropriate answer (yes or no) regarding his request. Moreover, a recurrent answer the researcher kept getting was "we passed on the message, when we hear back from the management we will get back in touch

with you". After a while, the researcher gave up. Surprisingly, Carphone Warehouse accepted to assist right after the researcher visited a few of their shops. The researcher was asked to forward the questionnaire to Carphone Warehouse store managers in Edinburgh, and they all agreed to forward it to their employees' emails for completion. Other minor problems were encountered in administering the questionnaire. These included the respondents' computer not loading the questionnaire due to compatibility issues, tight IT security systems, or even due to site restrictions at their workplace.

The following section will detail all the processes that were adopted by the researcher in order to process and analyse the collected data.

4.7 MEASURES: RELIABILITY AND VALIDITY ISSUES

The term 'reliability' refers to "the extent to which obtained results are consistent over time" (Golafshani, 2003:598) and for quantitative research (especially the ones using surveys), the issue of reliability is paramount (Patton, 1990; Winter, 2000; Saunders *et al.*, 2009). For testing the reliability of a quantitative research, most researchers use an internal reliability test known as the Cronbach's Alpha Test (Nunnaly, 1978; Santos, 1999). Cronbach's Alpha Test (which is represented as α) is a coefficient of reliability (or consistency). It measures the internal reliability of a study or in other words how closely related a set of items (questions) are in a study. Usually, the Cronbach's Alpha Test coefficient ranges in value from 0 to 1. The higher the

score, the more reliable the generate scale is. Indeed, according to Nunnaly (1978), an acceptable reliability coefficient is 0.7 although lower thresholds are also used in the literature (Santos, 1999).

This research adopted the Cronbach Alpha Test to confirm the construct validity of the current study (Tsai *et al.*, 2011). The researcher chose to assess the reliability of each section of the prepared questionnaire. As such, the α coefficient was calculated for section two, three, four and section five of the questionnaire. The researcher had issues with question 6 of the questionnaire (are you working full-time or part-time?) which in some instance delivered a coefficient below the limit. The researcher took the decision to ignore question 6 and recalculated the coefficient which results are presented in Table 4.1 below.

Table 4.1 Reliability coefficients for this research's questionnaire

	α
Section 2	0.819998848
Section 3	0.990116939
Section 4	0.858334961
Section 5	0.737610659

As observed on Table 4.1, all α coefficients were over 0.7, hence satisfactory for this research internal consistency (Nunnaly, 1978; Pallant, 2010). Given that the questionnaire was already digitalised, the researcher chose to keep question 6 on the questionnaire but to ignore it during data analysis. The decision was taken in an attempt to reduce potential mistakes in trying to modify the online questionnaire and also to save time.

As for the issue of validity, conclusions drawn from analyzing questionnaires' data are only acceptable to the degree to which they are regarded as valid (Pallant, 2005, 2010). The term validity refers to whether (i) the means of measurement are accurate; and (ii) whether these means are actually measuring what they are intended to measure (Winter, 2000). In other words, it is the degree to which a questionnaire reflects reality. Punch (2005) states that a researcher in quantitative research must ascertain that his/her research meet numerous types of validity among which: (i) the face validity (where researcher seeks to establish that the measure actually reflects the content of the concept); (ii) the predictive validity (where the researcher applies a future criterion measure rather than a contemporary criterion as for the concurrent validity); (iii) the construct validity (the researcher usually deducts hypotheses from a theory that is relevant to the concept studied); (iv) the concurrent validity (the researcher uses contemporary criterion on which cases are known to differ and that is appropriate to the studied concept); (v) the convergent validity (the validity of a measure have to be gauged by comparing it to measure of the same concept developed through other methods); and (vi) the content validity (see Bell and Bryman, 2007; Bryman and Bell, 2007). Punch (2005) states that construct validity, content validity, and predictive validity are the most suitable methods for proving the validity of questionnaires.

With regard to this study, one of the main criteria for the validity of this research was that the formulated questions had to be based on theoretical concepts, some of which were drawn from previous validated questionnaires

(see section 4.5.2 and 4.5.3). Moreover, having theorised and made hypothesis such as the socio-demographic influences on environmental awareness, construct validity is appropriate for measuring this study construct (Del Greco *et al.*, 1987). As such, Factor Analysis techniques of Confirmatory Factor Analysis (CFA) were used to establish the validity of each construct in this research (Gadenne *et al.*, 2008). CFA is a statistical technique which verifies the factor structure of a set of observed variables and allows researchers to test their hypotheses regarding possible "relationships between observed variables and their underlying latent construct exist" (Suhr, 2006: 1). Moreover, according to Pallant (2010: 104), this technique is appropriate when a researcher is developing scales and measures to categorize an underlying structure. On that basis, a Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity (both are Factor Analysis techniques) were carried out in this research (Williams *et al.*, 2010). KMO is an index (also referred to as the eigenvalue rule (Pallant, 2010)) which measures a sample adequacy. KMO index ranges from 0 to 1 and according to Pallant (2010), for a researcher to get data suitable for factor analysis, KMO value should be equal to 0.6 or more and the Bartlett's Test of sphericity value should be significant. Nevertheless, it is commonly accepted among researcher that an index larger than 0.5 is satisfactory (Williams *et al.*, 2010). As for the Bartlett's Test of sphericity, it is a statistic test which examines the hypothesis that variables are uncorrelated in the sampled population. Bartlett's Test is usually calculated together with the KMO index by the SPSS software (Pallant, 2010). In sections 4 and 5, measurement scales were developed to confirm the researcher' constructs regarding environmental awareness. As such, a KMO

index was calculated to establish the validity of this research's construct (See Table 4.2).

Table 4.2 - Kaiser-Meyer-Olkin and Bartlett's Test results for validity of this research construct

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.686
Bartlett's Test of Sphericity	Approx. Chi-Square	1369.766
	df	378
	Sig.	.000

As presented on Table 4.2, KMO value is 0.686 which is above Williams *et al.*'s (2010) value of 0.5 as well as Pallant's (2010) value of 0.6. Moreover, Bartlett's Test of sphericity was equal to 378 which is significant (Williams *et al.*, 2010). As such, the validity of this research questionnaire is satisfactory.

4.8 DATA PROCESSING AND ANALYSIS

Before presenting the data processing and analysis adopted for this research, it is important to highlight that during the questionnaire design, great care was taken to ensure that the host software used for the digitalization of the questionnaire was compatible with Microsoft Office Excess and IBM SPSS version 20. Such decision proved to be satisfactory as data input of collected questionnaires was faster. Indeed, all of the collected data were imported into IBM SPSS in three clicks, enabling quicker data processing. With regards to data treatment, this part looks at the characteristics of the data analysis implemented by the study. It also presents the choice of statistical and

analytical techniques used for the research. Analysing the collected data did present challenges. Indeed, as stated by Hoepfl (1997: 55), the collected raw data needed to be converted and interpreted into logical and meaningful results. This study used pictorial technique (charts, graphs) during the analysis. Moreover, regarding hypotheses testing analytical technique is applied using an explanatory analysis (Chi-square Test) and parametric analysis (t-Test).

4.8.1 Data entry

Inevitably, 17 responses were excluded from the analysis as stated earlier. The excluded sample included respondents from non-targeted countries such as Jordan (2), Canada (2), Tanzania (1), South Africa (1), China (1), France (3), Germany (4), Italy (2), and the Netherland (1). Such exclusion is deemed unavoidable (Saunders *et al.*, 2009; Easterby-Smith *et al.*, 2008; and Hoepfl, 1997). Following data collection, and to ensure accuracy, the processing and analysing of the data was performed using the IBM Statistical Package for Social Science (SPSS) for Windows XP. IBM SPSS version 20 is the statistical software for analysing comprehensive data to detect complex relationships existing between variables of the data collected, including descriptive statistics of sample data, regrouping of data sets with similar characteristics, analysing tendencies, and performing both parametric and non-parametric test (Pallant, 2005; Kinnear and Gray, 1999). The use of the electronic questionnaire facilitated the data entry into IBM SPSS. Indeed, the survey provider offered direct data transfer to IBM SPSS and to Microsoft Excel sheet. This saved the researcher from manually imputing all the 83 questionnaires into the statistical software. However, the extra 10

questionnaires were manually added into IBM SPSS. Also, where necessary, Microsoft Excel application was used to assist and corroborate some of the findings.

4.8.2 Coding Scheme and Scale of Measure

The coding scheme represents the first step of data analysis. In this research, it represents the process during which the questionnaires' data were converted into meaningful categories to facilitate the analysis process (Miles and Huberman, 1994, Huberman and Miles, 2002; Easterby-Smith *et al.*, 2008). Fortunately, the platform used for the questionnaire design and administration automatically provided the researcher with the coding of the questionnaire. This proved useful as a considerable amount of time was saved in the process.

As for the measurement scale (also known as 'the theory of scale types') which refers to the different types of scales used for analysis in social sciences, this study used quantitative variables (which regroups nominal and ordinal scales) and to some extent qualitative variables (which includes discrete and continuous variables) (Robertson, 2002). Kinnear *et al.* (1999: 33) define a variable as a "characteristic or property of a person, an object or a situation, which comprises a set of different values or categories." As for a nominal variable, it refers to a scale taking a set of distinctive value but in no natural order (e.g. people gender: male or female). An ordinal scale of variables is data which are in a rank-order (e.g. degree of preference). A discrete scale is a count up of the number of times something takes place (e.g. the number of employees in an organisation) (Robertson, 2002). The

continuous scale is a variable which can take any value in a given range (e.g. a respondent's weight or height). With regard to this study, subsequent to data collection, the researcher followed steps recommended by Bogdan and Biklen (1982, 1992) and Miles and Huberman (1994) regarding data management. These included: data organizing and condensing, data reduction, data display, and conclusion drawing as well as verification.

Moreover, the IBM SPSS software proved particularly useful as it permits the regrouping of data sets with similar characteristics. The software helped during the 'tendencies' analysis, as well as it was useful for the performing of parametric and non-parametric test. IBM SPSS also enables the processing of descriptive statistics of the collected data. The researcher used categorical data as well as numbers as identifiers regarding the representation of a nominal scale of measurements. For instance, Males were coded as "1" and female were coded as "2". Moreover, binary variables - categorical variables with only two possible outcomes (i.e. Yes versus No; False versus True) were adopted. Moreover, bivariate analysis was used to establish association between two variables.

Furthermore, Microsoft Office Excel application had useful statistical and mathematical tool of analysis which enabled the researcher to perform bi-variate data analysis. Microsoft Excel proved to be adequate due to its battery of functions that enable statistical analysis as well as the fact that it permits researchers to segment data in order to view/establish possible dependencies based on selected features (Microsoft, 2012). Microsoft Excel proved useful for the displaying of histograms, graphs and charts. Furthermore, multiple

variables analyses were adopted. As such, correlation and dependence were used in 'the search for sensitive relationship' of the sample population.

In term of specific statistical tools, this research used the following:

The Chi Square

The Chi-square Test is used to determine whether two categorical variables are related. It compares the frequency of cases found in the various categories of one variable across different categories of another variable (Pallant, 2005). For this technique to be validly applied to the sampled data, at least 70% of the data must have an expected count superior to 5. If this criterion is satisfied, the researcher must calculate the p-value using a statistical method. As a result, to test for the statistical significance and the validity of hypotheses, a series of Chi Square analysis were conducted. Wherever the calculated p-value was less than 0.05, the researcher hypothesis was considered valid. However, whenever the p-value was greater than 0.05, the researcher hypothesis was deemed non-valid and was rejected. Chi Square were used in this research to test for correlation between (i) environmental knowledge and environmental behaviour; (ii) socio-demographic factors and their perceptions of their organisations' environmental policies; and (iii) for specific likert scale questions present on the questionnaire.

Spearman's rank Order correlation

Spearman's rank correlation coefficient also referred to as Spearman's rho is a non-parametric test which measures the statistical confidence between two

variables (Pallant, 2010). Spearman's rank coefficient determines the extent to which a relationship between two variables can be described using a monotonic function. This test is appropriate when the assumptions of the Pearson correlation are markedly violated (i.e. Chi-Square) (Ramsey, 1989). In computing Spearman's rank correlation coefficient, the absolute value of rho (i.e. |rho|) indicates the strength of the relationship between two studied variables. Moreover, whenever the value of rho approaches 1, the strength of the relationship increases. But if rho approaches o, the relationship is considered as being weaker. Furthermore, the sign of rho indicates the direction of the relationship (e.g. positive (+1) versus negative (-1)) (see Sheskin, 2004). Spearman's rank Order correlation was used to explore the relationship between socio-demographic factors and employees' perceptions of their organisation. It was also used to determine if any association between environmental facilities and activities and respondents' EA.

Factor analysis

Factor analysis is a collection of methods used by researchers to reduce a large number of interrelated questions to a smaller number (Cappelleri *et al.*, 2000) and to examine how underlying common factors influence the responses of a number of measured variables (Decoster, 1998). Decoster (1998:1) states that there are two types of factor analysis: (1) the exploratory factor analysis which is the orderly simplification of interrelated measures (Suhr, 2006). The method attempts to find the nature of construct(s) influencing a set of responses and it is adapted for research where the researcher tests the validity of their questionnaire, and carries out analysis by assessing correlations patterns between studied measures. Such measures

are extremely correlated (they can either be positive or negative) and they are likely to be influenced by the same factors, whereas those that are relatively uncorrelated are probably influenced by different factors (Cappelleri *et al.*, 2000); and (2) the confirmatory factor analysis which determines the influence of a specific set of constructs on respondents' responses in a predicted manner. The technique is adapted for research in which the researcher tests the hypothesis that a relationship between observed variables and their fundamental hidden/latent construct(s) exists (Torres-Reyna, 2012; Suhr, 2006).

Factor analysis techniques are based on linear statistical models and they assume a normal distribution of variables (Suhr, 2006). With this research, in order to test the questionnaire reliability and validity, an exploratory factor analysis was carried out. Section 2 of the questionnaire, which consisted of eighteen questions, all aimed at evaluating respondents' environmental behaviour at personal level provided the items needed for evaluating employees' attitudes/behaviour toward the environment. Moreover, section five of the questionnaire, which consisted of eight items aiming at obtaining information regarding respondents' satisfaction with their organisation environmental action(s), was designed so that a higher item score indicated a more favourable attitude. Each of the eight questions received equal scores when totalled to arrive at an overall score.

_t_-Test for statistic significance

The *t*-test is a parametric test that assesses whether the means of two groups are statistically different from each other (e.g. it offers the opportunity to

compare two groups on scores for instance the difference between women and men (Robertson, 2002). Two types of *t*-Tests were used in this research: (1) the dependents samples t-Test (Kinnear and Gray, 1999), which is used when comparing two means that are dependent on each other (Pallant, 2005); and (2) the independent means *t*-test, which is used to compare two groups whose means are not dependent on one another (Borden, 2009). Parametric tests (one sample *t*-test) were used to compare proportion and to statistically determine whether there was a correlation between each of the socio-demographic variables and environmental knowledge. Moreover, independent samples t-tests were conducted to compare opinion scores with respondents' gender, parental status, educational level and job type. Also, *t*-tests were conducted to compare environmental behavioural scores with respondents' socio-demographic factors.

Binomal Regression

Binomial regression is a statistical technique in which the response is the result of a series of one of two possible disjoint outcomes (habitually designated as "success", "yes" or 1, and "failure", "no" or 0) (Pallant, 2010). This technique is useful for circumstances where a researcher wants to be able to predict the occurrence or the nonexistence of an outcome based on values of a set of predictable variables (Pallant, 2010). For example, in this study, the researcher used the technique to determine whether the gender characteristic played a role in respondents' answers to some questions. Binomial regression tests were used to analyse data for Question 51 'Do you feel that more needs to be done regarding your company environmental policy?' Moreover, binomial tests were used to establish if an association

existed between environmental facilities/activities and respondents' environmental awareness.

Statistical confidence interval (CI)

According to Beaulieu-Prévost (2010), statistical confidence interval (CI) is gradually becoming the standard way of reporting statistical results analyses in research articles and are used instead of/or in addition to *p*-value. Confidence interval value is represented by a percentage. Commonly accepted values for CI are 95%, 98% or 99%. As for hypothesis testing, when calculating CI there are three possibilities. Indeed, according to Beaulieu-Prévost (2010:49), "(i) if CI value is completely outside of the range of the values defined by the hypothesis (i.e. $p<0.05$ for an alpha of 0.05), the hypothesis is rejected; however, (ii) if CI value is within the range of the values defined by the hypothesis (i.e. $p>0.95$ for an alpha of 0.05), the hypothesis is confirmed; finally, (iii) another possibility is to have CI value partly included in the range of values defined by the hypothesis and partly excluded from that range (i.e. $0.95>p>0.05$ for an alpha of 0.05), in such case, the hypothesis is considered as undetermined due to lack of statistical power." A statistical confidence interval (CI) was used during the testing for a correlation between respondents' socio-demographic factors and environmental awareness. Moreover, CI was used to test the reliability of estimated percentages regarding respondents' views of their workplaces environmentally friendliness, and whether respondents felt more needed to be done regarding their organisations' environmental policies (referred to by many studies as CI around a percent) (see Smithson, 2003, 2005).

4.9 THE IMPORTANCE OF ETHICS FOR THE RESEARCH PROCESS

In social sciences, the researcher is not only expected to contribute to knowledge but he/she must make sure that he/she adopts ethical behaviour toward his/her research the respondents and sponsor. Easterby-Smith *et al.* (2008), identify two recurrent ethical issues with organisational researchers: (i) the use of subjects' observation research methods which are likely to be deceitful; and (ii) the control, the ownership and the use of data gathered by the researcher. For this study, the researcher applied and was granted the ethical research approval by the University of Abertay Dundee Business School Ethics Committee in 2010. The ethical approval process aims to ensure that issues of non-ethical practices are avoided. Moreover, an approval by the Ethic Committee means the research objectives, methods, and analysis meet the principles of ethical practice in the social sciences field (see Bell and Bryman, 2007). Besides, the researcher made sure that all the findings were truthfully and accurately reported. Overall, it is important to point out that no academic research is perfect; indeed all researchers have some degree of bias that may affect the outcome of their study (Bailey *et al.*, 1994:132). Therefore identifying potential biases and reducing the possibility of errors are beneficial for the research (Bailey *et al.*, 1994). Furthermore, the researcher applied the 1988 United Kingdom Data Protection Act requirements during the control, ownership and exploitation of the data collected. The researcher made sure that the data were not presented in a way that could expose or harm any of the respondents.

4.10 CONCLUSION

This chapter has presented a review of the main research philosophies and adopted (and discussed the rationale for using) a positivist paradigm for this research. A review of research approaches in social sciences was carried out as well as the rationale for adopting a deductive approach. Furthermore, having adopted a quantitative approach, the chapter reviewed the main research strategies and methods, and adopted the research questionnaire for collecting and analysing data. Moreover, the issues of reliability and validity of this research was discussed and relevant tests were carried out to establish the reliability and the validity of the questionnaire. Moreover, the IBM Statistical Package for Social Science (SPSS) for Windows XP version 20 and the Microsoft Excel were chosen for performing statistical tests for assessing the validity of this research's hypotheses. Finally, this chapter discussed the issue of ethics as well as the adopted approaches to avoid such non-ethical practices. Having discussed and adopted a research methodology, the following chapter presents the analysis of data obtained from the questionnaires' responses as well as the result of the hypotheses testing.

CHAPTER FIVE

RESULTS OF THE STUDY

5.1 INTRODUCTION

The previous chapter explained the methods employed for gathering data regarding the sampled population, and the 'tools' used for administrating, as well as analysing the questionnaires. This chapter deals with the outcome of the application of the statistical techniques to the collected data. The chapter is organised as follows: section 5.2 contains a profiling of this study's respondents, while section 5.3 presents employees' motives for adopting environmental management. Section 5.4 presents statistical techniques (Chi-square test, Spearman's rank order correlation, *t*-test for statistic significance, binomal regression and the statistical confidence interval) analyses and results which are used to test Hypotheses for possible: (i) Socio-demographic correlation with Environmental Awareness; (ii) environmental education correlation with pro-active environmental actions; and (iii) organisations' environmental policies association with their reputation among their employees. The chapter concludes with a summary of this research findings.

5.2 RESPONDENTS' PROFILES

Background data collected from the respondents were cross-tabulated to provide additional information on the respondents, and to expand the researcher's analysis with regards to respondents' perception and behaviour with the environment. As shown on Table 5.1 below, there were 40 males (43%) and 53 females (57%). Moreover, a total of 17 respondents (18.3%) were aged between 16 and 24 (9 females and 8 males) while 49 respondents (52.7%) were aged between 25 and 34 (21 males and 28 females). Also, 17 respondents (18.3%) were aged between 35 and 44 (8 males and 9 females). Also, 5 respondents (5.4%) were aged between 45 and 54 years (4 females and 1 male) and 5 others (5.4%) were aged between 55 and 64 (2 male and 3 females). There were no respondents above the age of 65.

Table 5.1 - Respondents' gender and ages

Median Age	**16 – 24**	**25 – 34**	**35 – 44**	**45 – 54**	**55 – 64**	**Over 65**	**Total**
Females	9	28	9	4	3	0	**53**
Males	8	21	8	1	2	0	**40**
Total	17	49	17	5	5	0	**93**

Moreover, as shown from Table 5.2 in the following page, 10 respondents (10.8%) had less than a high school qualification, while 2 (2.1%) of them had a high school degree. Moreover, 12 respondents (12.9%) had a college degree, whereas 29 (31.2%) had an undergraduate degree. Furthermore, 32 respondents (34.4%) had a master degree, and 8 (8.6%) had a PhD degree. Overall, 74.2% of all respondents had a university degree.

Table 5.2 - Respondents' educational level

Education level	<High school	High school	College	Graduate	Master	PhD
Respondents	10	2	12	29	32	8

Of all the 93 respondents, only 18 (19.4%) were parents. In terms of employment, 56 (60 %) respondents (with 48% females and 52% males) held a fulltime job while the remaining 37 (40%) had a part-time employment (30% males and 70% females). Furthermore, the respondents had a variety of jobs which are classified into 7 categories (see Table 5.3).

Table 5.3 - Respondents employment by sectors

SECTORS OF ACTIVITIES	Number of the respondents and gender	Total	%
Education field	10 Males and 11 Females	21	22.6%
Customer relation	16 Males and 33 Females	49	52.7%
Management	1 Females and 4 Males	5	5.4%
Analyst	2 Females and 6 Males	8	8.6%
Scientific & Engineer	2 Males and 2 Females	4	4.3%
Medical	2 Males and 2 Females	4	4.3%
Secretary	2 Females and 0 Males	2	2.2%

The findings of this study show that 76% of the respondents live within a 5 mile radius from their workplace. Moreover, 46% of them have access to a

car. Respondents with access to a car primarily choose their car based on the brand (56%). Moreover, 51% of the respondents regard the 'engine fuel efficiency' as an important element of their car selection. Also, most of the respondents use their cars primarily for social and leisure activities (69.8%). It is followed by shopping (55.8%), domestic reasons (34.9%) and business reasons (30.2%). Also, only 13% of the respondents are smokers. Moreover, 70% of the respondents practice recycling at home (most of them (57%) started less than 5 years ago). They recycle mainly: paper and cardboard (59%), plastic and glass (55%), packaging (51%), cans (44%), batteries (30%), electronics (17%) and organic wastes (13%). Interestingly, most of them recycle because:

(i) They wish to save the environment (80%);

(ii) Recycling points are available (45%);

(iii) It 'feels good to do it' (39%);

(iv) They believe it 'is good for the economy' (22%);

(v) The legislation (19%);

(vi) 'Everyone is doing it' (14%);

(vii) They want 'to save money' (6%);

(viii) Incentives (5%); and

(ix) Other reasons (9%).

Furthermore, when asked to explain why they (the respondents) were adopting recycling practices, 80% of the respondents said they recycle 'to save the environment'. This is followed by the availability of recycling points, which plays an important role in 45% of the respondents' decision to recycle.

All of the other reasons are detailed in Table 5.4. Table 5.5 below summarises the respondents' answers to the question relating to how long they had been recycling. The majority (57%) started less than 5 years ago, and that females adopted recycling for a longer period than their males' counterpart. Moreover, all respondents who started the recycling less than 1 year ago were all aged between 25 and 34 to the exception of 1 female (aged between 35 and 44). Furthermore, none of them were parents; all of them were university graduates, except 1 female who had a college degree.

Table 5. 4 Respondents' reasons for adopting recycling

	RECYCLING REASONS								
GENDER	To save the enviro nment	Availabili ty of recycling points	It feels good to do it	It is good for the econom y	The legislatio n	Everyon e is doing it	To save money	Because of incentive s	Other reasons
Males	20	10	8	5	7	5	3	1	3
Females	32	19	17	9	5	4	1	2	3
%	80%	45%	39%	22%	19%	14%	6%	5%	9%

Table 5.5 - Time since respondents started recycling

	Less than 1 year	1 - 4 years	5 - 9 years	10 - 14 years	15 - 19 years	more than 20 years
Male	1	16	6	2	0	0
Female	4	16	11	6	0	3
Total	5 (5.4%)	32 (34.4%)	17 (18.3%)	8 (8.6%)	0	3 (3.2%)

Table 5.6 in the following page shows that paper and cardboard are the most recycled items (55 of the respondents). These are followed by plastic and glass (51 respondents), then by packaging (47 respondents), cans (41 respondents), batteries (28 respondents), electronics (16 respondents), and organic waste (12 respondents).

Table 5.6 - Items recycled by respondents

	Paper & Cardboard	Packaging	Electronics	Organic	Plastic	Cans	Batteries	Glass	Others
Male	20	15	6	5	20	14	8	18	1
Female	35	32	10	7	31	27	20	33	5
Total	55 (59%)	47 (51%)	16 (17%)	12 (13%)	51 (55%)	41 (44%)	28 (30%)	51 (55%)	6 (7%)

Furthermore, the majority of the respondents (54.8%) promote recycling amongst friends. It is also found that the female respondents are more inclined to promote recycling amongst family and friends (62.8%) than the male respondents (37.2%). The results also show that the majority (40.9%) of the respondents said that recycling is not part of the British culture, while only 36.6% of them regard recycling as being incrusted in the culture, and 22.6% of the respondents cannot say whether it is part of the culture or not. Furthermore, it is also the female respondents who tend to keep informed regarding environmental issues (47.3% of the respondents in total of which 32% are males and 68% are females). Moreover, newspapers are the respondents' main source of environmental information (17.2%), followed by the TV/radio at 15.1% and internet at 13%. Moreover, the following factors are cited by the respondents as a recycling deterrent: laziness, inconvenience, 'it does not make a difference', and 'the lack of space'. Besides, when asked what would encourage them to recycle, most respondents replied that they would engage in recycling if they 'see everyone doing it'.

5.3 EMPLOYEES' PERCEPTIONS AND BEHAVIOUR TOWARDS ENVIRONMENTAL MANAGEMENT

This section presents the results regarding the respondents' behaviour towards the environment, including their perception of their workplaces' environmental policies.

5.3.1 Employees' Behaviour toward the Environment

In order to establish employees' behaviour toward the environment, when asked how far the respondents work away from home, 71 respondents (76%) said they lived within a 5 mile radius from their workplace. Moreover, 12 respondents (13%) reside between 5 to 10 miles away from their place of work. Also, 8 respondents (8.6%) live between 10 to 15 miles away from their workplaces and the remaining 2 (2.2%) live more than 15 miles away from their workplace. Furthermore, when asked if they had access to a car, 46% of the respondents said they had access to a car (24 females and 19 males). The 'brand' was the leading element influencing respondents' car selection (56% of the sample (11 males and 13 females)) as well as the engine fuel efficiency (9 males and 13 females which represented 51% of the sample). Other important elements included 'diesel engine' (28% of the sample), the 'speed of the car' (19%) and the engine eco-friendliness (19%). Also, most of the respondents who had car access preferred 'a manual gear' car (54%), while 33% of the respondents did not mind and only 14% opted for ' an automatic gear'. Besides, 69.8% of the respondents who had access to a car said they used it primarily for social and leisure activities. The other main reason for using a car was for shopping (55.8%) followed by other domestic

reasons (34.9%). Moreover, 30.2% of the sample used cars for business reasons, while 11.6% used it for education. Finally, 16% of the respondents used their cars for all of the mentioned activities which are social and leisure, shopping and domestic reasons, educations, and business activities.

When asked if they used public transportation, a total of 67 respondents (39 females and 28 males) said they had used public transport, while the remaining did not. Fifty six respondents (60.2%) used the bus as their main public transport at least twice a week (20 males and 36 females). Moreover, only 1 female respondent used the ferry (occasionally), while 18 respondents used rapid transit such as tramways or trains (9 females and 9 males) and 19 used taxis (10 females and 9 males).

Table 5.7 below shows that female respondents practice cycling more often than their male counterpart. Moreover, Table 5.8 in the following page shows that only 26% of the respondents practice cycling (54.2% females and 45.8% males).

Table 5.7 Respondents' cycling frequencies

	1-2 days a week	3-4 days a week	5 - + days a week	< 1 month	Once a month	Twice a month	Other
Males	5	0	0	3	2	0	1
Females	0	1	5	1	2	1	3

Table 5.8 - Socio-demographic classification of the respondents according to car access and cycling habits

	Age group	Access to Car	Do you Cycle ?	Education	Access to Car	Do you Cycle?	Children	Access to Car	Do you Cycle ?	Job title	Access to Car	Do you Cycle ?	Total Access to Car
Female	Under 16	**0**	**0**	Less than High School	**1**	**1**	Yes	**3**	**1**	secretary	**2**	**1**	**24**
	16 - 24	**4**	**1**	High school	**2**	**2**				education	**2**	**3**	
	25 - 34	**10**	**7**	College	**5**	**3**	NO	**21**	**12**	customer relation	**14**	**6**	
	35 - 44	**4**	**3**	Undergraduate	**9**	**2**				management	**1**	**0**	**Total Cyclists**
	45 - 54	**3**	**0**	Master	**7**	**5**				analyst	**2**	**1**	
	55 - 64	**3**	**2**	PhD	**0**	**0**				scientists& engineer	**2**	**2**	**13**
	65 - 74	**0**	**0**							medical	**1**	**0**	
	75 - more	**0**	**0**										
	Age Group	**Access to Car**	**Do you Cycle ?**	**Education**	**Access to Car**	**Do you Cycle? ?**	**Children**	**Access to Car**	**Do you Cycle ?**	**Job Title**	**Access to Car**	**Do you Cycle ?**	**Total Access to Car**
Male	Under 16	**0**	**0**	Less than High School	**3**	**1**	Yes	**3**	**3**	secretary	**0**	**0**	**19**
	16 - 24	**0**	**0**	High school	**0**	**0**				education	**5**	**3**	
	25 - 34	**10**	**6**	College	**0**	**0**	NO	**16**	**0**	customer relation	**7**	**4**	
	35 - 44	**6**	**4**	Undergraduate	**6**	**3**				management	**0**	**1**	**Total Cyclists**
	45 - 54	**1**	**1**	Master	**4**	**3**				analyst	**4**	**2**	
	55 - 64	**2**	**0**	PhD	**6**	**4**				scientists& engineer	**1**	**1**	**11**
	65 - 74	**0**	**0**							medical	**2**	**0**	
	75 - more	**0**	**0**										

5.3.2 Employees perception of their workplace environmental management

A total of 37.6 % of the respondents did not know how many employees their organisations had. Also, 33.33% of the respondents worked for large organisations of more than 1000 staff; while 8.6% of the respondents worked for large organisations comprising between 251 and 1000 employees. Another 8.6% of the respondents worked for medium sized companies (between 51 and 250 employees) while 11.8% of the respondents worked for small organisations (between 2 to 50 employees). Also, 3.2% of the respondents did not know whether their organisations' employees were located at one facility. Moreover, 11.8% of the respondents stated that they worked for organisations which had all their employees located at one facility, and the remaining, (85%), worked for organisations which had employees located at more than one facility.

In response to the question 'What would encourage you to undertake environmental initiatives within your organization?' it appears that 'seeing everyone doing it' is the main reason for the respondents' green actions (26% of the whole population or 37% of the respondents who recycle at home). See Table 5.9 for all the results.

Table 5.9 - Respondents' motivation for adopting 'green actions'

Motivation for 'green action'?	I do not require anything to do it	The prospect of improving my company image	Promotion	Seeing everyone doing it	Incentives	Recognition by other	The prospect of reducing my organisation's cost	Other
Male	7	4	5	11	11	3	9	0
Female	9	5	6	13	8	7	7	2
Total	16 (17%)	9 (10%)	11 (12%)	24 (26%)	19 (20%)	10 (11%)	16 (17%)	2 (2%)

Furthermore, this research also intended to establish the main organisations' incentives for adopting favourable environmental policy (from an employee's perspective). As such, the respondents were asked to 'select three (3) factors which they think influence the most their organization's environmental policy decision'. The results are presented on Table 5.10 below.

Table 5.10 - Employees' views of factors influencing organisations' environmental policy

Influences on Organisations' environmental policy	Males	Females	Total
Managers' decisions	16	26	42
Employees' pressure	4	4	8
Customers' pressure	7	11	18
The competition	6	5	11
Community's pressure	7	13	20
The legislation	14	19	33
Shareholders' pressure	7	7	14
Suppliers' pressure	2	2	4
The moral factor	5	15	20
The waste disposal cost	9	15	24
Information access	4	2	6
The organisation finance	10	9	19
Technological advancement	2	4	6
New market for green products & services	0	3	3
To avoid liability costs for non compliance	10	10	20
Benchmark with other organisations	2	5	7
Other	16	11	27

Moreover, 11 respondents (6 males and 5 females) said they had consulted their management regarding environmental issues. About 18.3% said to had in the past influenced their organisations' environmental actions (11 males and 6 females); while 12% said that their organisations collected feedback from employees regarding environmental issues.

5.4 SOCIO-DEMOGRAPHIC CHARACTERISTICS AND ENVIRONMENTAL AWARENESS

Doing statistical tests to measure employees' environmental awareness (Hypothesis H_32) implies testing: (1) their environmental knowledge; (2) their perception; and (3) their environmental behaviour. Besides, testing for Socio-demographic characteristics association with Environmental Awareness (Hypothesis H_33) also involves testing for another Hypothesis (related to H_33): H_22 (Social Status and Environmental Awareness). Concerning statistical tests, parametric tests (one sample *t*-test) were used to compare proportion and to statistically determine whether there was a correlation between two variables (for example, gender and environmental knowledge). Moreover, tests for statistical significance were carried out to ensure that a correlation existed between each two variables not just a chance occurrence.

5.4.1 Environmental Knowledge

In relation to environmental knowledge, no respondents managed to correctly answer all the environmental knowledge questions. The results are presented below for each Socio-demographic variable.

1. Gender and environmental knowledge

In section 2 of the questionnaire (see Appendix H), respondents were quizzed about their environmental knowledge. Statistical tests results reveal that on average, 49.2% of male respondents and 51.8% of female respondents gave correct answers to most of the questions. A one sample *t*-statistic test

between proportions was performed to determine whether there was a significant difference between the percent level of environmental knowledge between males and females. The *t*-statistic was not significant at the 0.05 critical alpha level (α =0.05). Indeed, Table 5.11 shows that t=0.250, and p=0.8035. As a result, with the p-value greater than the alpha level ($p>\alpha$), the null Hypothesis (*$H^0$1.1: Males do not have a higher environmental knowledge than females*) was accepted given that the difference between males and females was not significant.

Table 5.11 - Gender and environmental knowledge

	Males Versus Females
t-value	0.25
Two-tailed probability	0.8035

2. Age and environmental knowledge

The results show that on average, 50.26% of the respondents with a mean age of 20 answered the questions correctly. The figure was 49.72% for respondents with a mean age of 29.5. For respondents with a mean age of 39.5, an average of 50.8% answered the questions correctly. Furthermore, an average of 55.5% of the respondents with a mean of 49.5 and 59.5 answered environmental questions correctly. The researcher applied two sample *t*-test between percents to statistically confirm (or infirm) the findings. The test was used to compare percentages drawn from two subgroups (i.e. mean age of 20 compared to mean age of 29.5). The results are listed in Table 5.12 in the following page.

Table 5.12 - Two sample t-test between percent results on respondents mean age subgroups

	Mean age of 20 compared to mean age of 29.5	Mean age of 20 compared to mean age of 39.5	Mean age of 20 compared to mean age of 49.5	Mean age of 20 compared to mean age of 59.5	Mean age of 29.5 compared to mean age of 39.5	Mean age of 29.5 compared to mean age of 49.5	Mean age of 29.5 compared to mean age of 59.5	Mean age of 39.5 compared to mean age of 49.5	Mean age of 39.5 compared to mean age of 59.5	Mean age of 49.5 compared to mean age of 59.5
t-value	0.038	0.031	0.21	0.21	0.077	0.25	0.246	0.185	0.19	0
Degrees of freedom	64	32	20	20	64	52	52	20	20	8
Two-tailed probability	0.9695	0.975	0.84	0.84	0.939	0.81	0.807	0.855	0.86	1

The *t*-statistic was not significant at the 0.05 critical alpha level ($\alpha = 0.05$). As shown on Table 5.12 above, a total of 10 values of t and degree of freedom as well as probabilities were obtained. Although some *t*–value were below 0.05 (e.g. t(63)=0.038 and t(32)=0.031) all results reveal a p-value greater than the alpha level ($p>\alpha$). Therefore, the probability for t (63) and t(32) been $<\alpha$ (t(63)'s p value p=0.9695; t(32)'s p value p=0.975), the possibility of the results been due to random chance was great. This means that although the null Hypothesis (*$H^0$1.2: Older employees do not have better level of environmental knowledge than younger employees*) cannot be rejected for most of the mean ages' comparison. However, *$H^0$1.2* can be rejected for (i) the mean age comparison of the respondents aged 20 compared to those aged 29.5; and (ii) respondents aged 20 compared to those aged 39.5.

3. Education and environmental knowledge

The statistical tests show that on average, 43.18% of the respondents with less than a high school degree, an average of 50% of the respondents with a high school degree, and an average of 48.86% of the respondents with a college degree, had a good environmental knowledge level. Moreover, an average of 53.45% of the respondents with an undergraduate degree, an average of 50.43% of the respondents with a masters' degree, and an average of 55.11% of the respondents with a PhD degree, correctly answered the environmental knowledge questions. Two sample *t*-test between percents to statistically confirm (or infirm) the findings (See Table 5.13, next page). The *t*-statistic was not significant at the 0.05 critical alpha level ($\alpha = 0.05$).

Once more, all t-values were either too high or whenever they were at an acceptable level, the p-value was high (see Table 5.13). Therefore, the null Hypothesis (*$H^0$1.3: employees with higher education level do not have higher level of environmental knowledge*) is retained.

Table 5.13 - Education level and environmental knowledge

	<High School Compare to High School	<High School Compare to college	<High School Compare to undergraduate	<High School Compare to Master	<High School Compare to PhD	High School Compare to college	High School Compare to undergraduate	High School Compare to master
t-value	0.177	0.266	0.56	0.4	0.503	0.03	0.095	0.012
Degrees of freedom	10	20	37	40	16	12	29	32
Two-tailed probability	0.8629	0.7929	0.5787	0.691	0.6216	0.9767	0.9253	0.9907

	High School Compare to PhD	College compare to undergraduate	College compare to master	College compare to PhD	Undergraduate compare to master	Undergraduate compare to PhD	Master compare to PhD
t-value	0.13	0.268	0.093	0.274	0.236	0.083	0.237
Degrees of freedom	8	39	42	18	59	35	38
Two-tailed probability	0.9	0.7903	0.9265	0.7872	0.8144	0.934	0.814

4. Working type/position and environmental knowledge

The results show that on average, 46.8% of the respondents working in the education sector answered environmental knowledge questions correctly. That percentage was up to 52.32% for respondents working in customer relations, and to 50% for respondents working as secretaries. Moreover, 50% of the respondents working in management answered the questions correctly, 49.43% of the respondents working as analysts did the same. Also, 55.68% of the respondents working as scientists or engineers answered correctly, and 56.82% of the respondents working in the medical sector answered the questions correctly.

As shown on Table 5.14, most of all *t*-values greater than the alpha level ($p>\alpha$). Moreover, the *t*–values which are below 0.05 (e.g. t-value for secretary versus management) have a very small degree of freedom, plus their probability are greater to 0.05 (meaning that the chance for the results to occur by chance are great). On that basis, the null Hypothesis (*$H^0$1.4: Employees' profession have no influence on their level of environmental knowledge*) is accepted.

5. Parental status and environmental knowledge

On average, 49.5% of the respondents who were parents answered the environmental knowledge questions correctly. The percentage was 50.73% for respondents without children. A one sample t-test between the percents was

performed to determine whether respondents with children were more likely to be more environmentally knowledgeable than respondents without children. *T*-statistic test value t(92)=0.118 (with p=0.9059) which is greater than the conventional value of α =0.05. As a result, the null Hypothesis (*$H^0$1.5: Employees with children do not have a better level of environmental knowledge than employees without children*) was retained.

To conclude, in relation to environmental knowledge, Hypotheses testing revealed that: (i) no association existed between respondents' gender, and their environmental knowledge (i.e. *$H^0$1.1* was retained); (ii) a correlation existed between respondents' environmental knowledge, and their mean age (i.e. respondents with a mean age of 20 compared to those with a mean age of 29.5 and 39.5) and therefore, *$H^0$1.2* can be rejected; (iii) no correlation was established between respondents' education level, and their environmental knowledge (i.e. *$H^0$1.3* was retained); (iv) no association was established between respondents' job type and their environmental knowledge (i.e. *$H^0$1.4* was retained); and (v) no correlation was established between respondents' parental status, and their environmental knowledge (i.e. *$H^0$1.5* was retained). Consequently, it is not possible to confirm the influence of Socio-demographic factors on environmental knowledge to the exception of age.

Table 5.14 - T-test for respondents work type and environmental knowledge

	JOB TYPES						
	Education	**customer service**	**secretary**	**Management**	**Analysts**	**Scientists & Engineers**	**Medical**
Percentage of the respondents who answered environmental knowledge questions correctly	46.80%	52.32%	50%	50%	49.43%	55.68%	56.82%
	JOB TYPE *t*-tests comparisons						
JOB TYPE	**Education Vs Customer relation**	**Education Vs secretary**	**Education Vs Management**	**Education Vs Analysts**	**Education Vs Scientists**	**Education Vs Medical**	**Customer service Vs Secretary**
t-Value	0.423	0.087	0.129	0.127	0.326	0.368	0.064
Degree of freedom	68	21	24	27	23	23	49
Two-tailed probability	0.6734	0.9318	0.8986	0.9001	0.7476	0.7166	0.9489
JOB TYPE	**Customer service Vs Management**	**Customer service Vs Analyst**	**Customer service Vs Scientists**	**Customer service Vs Medical**	**Secretary Vs Management**	**Secretary Vs Analysts**	**Secretary Vs Scientists**
t-Value	0.099	0.152	0.206	0.173	0	0.014	0.132
Degree of freedom	52	55	51	51	5	8	4
Two-tailed probability	0.9216	0.88	0.8373	0.8631	1	0.9888	0.9017
JOB TYPE	**Secretary Vs Medical**	**Management Vs Analysts**	**Management Vs Scientists**	**Management Vs Medical**	**Analysts Vs Scientists**	**Analysts Vs Medical**	**Scientists Vs Medical**
t-Value	0.158	0.02	0.17	0.204	0.204	0.242	0.029
Degree of freedom	4	11	7	7	10	10	6
Two-tailed probability	0.882	0.9844	0.8702	0.8444	0.8423	0.814	0.9782

5.4.2 Environmental perception

Environmental perception data were statistically tested with the objective of determining possible 'patterns' of Socio-demographic influences on respondents' responses, which could then be statistically tested. As such, Chi-square statistics as well as cluster analysis are used to analyse the likert scale questions. Question 51 'Do you feel that more needs to be done regarding your company environmental policy?' is a 'yes' and 'no' type. On that basis, a binomial regression is applied to test the Hypothesis on that question. Also, question 56, is a 'multiple choice based (i.e. it requires respondents to list three elements which they regard as the most influential factors for their organisation environmental policy) and it could not be statistically tested. As a result, the researcher uses calculations to determine possible Socio-demographic influences on the respondents' perception of environmental issues. Given the variety of tests employed, the researcher lists the results by the type of test employed.

The independent samples t-tests are conducted to compare opinion scores with the categorical variables namely gender (males versus females), parental status (parents and non-parents), educational level and job type. Furthermore, the respondents were asked to provide three elements they regarded as the most influential factors for their organisation to adopt environmentally friendly practices. As such, where possible, t-tests are applied to statistically test the results.

1. Gender and environmental perception

Table 5.15 below shows that for statement (a), the value of the sig.(2-tailed) >α. Therefore, there is no significant difference in scores for males and females (t(91)=0.672, two-tailed). Moreover, the level of difference in the means (mean difference=0.320, confidence interval =-1.266 to 0.626) is very small (-0.0049). As for statement (b), the value of the sig.(2-tailed)is also > α. Consequently, there is no significant difference in scores for males and females (t(91)=1.004, two-tailed); and the level of difference in the means (mean difference=-0.363, confidence interval =-1.080 to 0.355) is very small (-0.01). With regard to statement (c), the value of the sig.(2-tailed) >α. No significant difference in scores for males and females is found (t(91)=0.378, two-tailed) and the level of difference in the means (mean difference=1.432, confidence interval =-0.611 to 0.898) is very small (0.00156). Finally, statement (d) has also a sig.(2-tailed) >α. Thus, no significant difference in scores for males and females is found (t(91)=1.465, two-tailed) and the level of difference in the means (mean difference=0.583, confidence interval =-0.207 to 1.373) is very small (0.023).

Referring back to Table 5.10 in section 5.3.2 it can be seen that respondents' perception of their organisations' most influential factors for the adoption of pro-active environmental policy. The Table shows that for men, 'managers' decision' and 'other factors' (both chosen by 40% of males) were the most influential factor. It was followed by 'the legislation' (35% of males). The third influential factors was either 'to avoid liability cost' (25% of males) or the organisation finance (25% of males). With regard to the females, 'managers' decision' was the most influential factor (49.1% of females). It was followed by

'the legislation' (35.8% of females). Females' third most influential factor was either 'the moral factor' or 'the wastes disposal cost' which both scored 28.3%. These results reveal that men and women have to some extend (the main difference is their third most influential factors) the same perception regarding factors influencing their organisations' environmental policy. The researcher applied a two sample t-test between the percentages to determine possible gender influences on the first two choices of the respondents. The results reveal a *t*-statistic test value t=0.873 (with p=0.3850) which is greater than the conventional value of α =0.05. The possibility of correlation between gender and their view of influential factor can therefore be rejected.

Therefore, it can be concluded from the above results that Hypothesis $H_3 1.1_{bis}$: *Males have a higher environmental perception than females* is rejected, thus the null Hypothesis $H_0 1.1_{Bis}$: *Males do not have a higher environmental perception than females* is retained.

Table 5.15 - Statistical results for gender and environmental perception

Environmental perception questions	Gender	M	SD	Mean Difference	95% of Confidence interval of the Difference		Sig.(2-tailed)	t
					Lower	Upper		
(a) It would be cost-effective for my organization to have pro-active environmental management policies	Males	4.92	2.495	0.32	-1.3	0.6	>α	
	Females	5.25	2.093					0.672
(b) My organization is pro-active with environmental management issues	Males	3.68	1.803	0.363	-1.1	0.4	>α	
	Females	4.04	1.664					1.004
(c) Environmental management is an important issue for the development of my organization	Males	4.2	1.8	1.432	-0.6	0.9	>α	
	Females	4.06	1.823					0.378
(d) Environmental education event(s) will improve employees knowledge in my workplace	Males	5.38	1.675	0.583	-0.2	1.4	>α	
	Females	4.79	2.051					1.465

2. Age and environmental perception

To permit statistical testing, employees' ages were grouped into 2 categories: Those who were 35 years or under (coded as category 1) and those who were above 35 years of age (coded as category 2). The results are presented in Table 5.16 in the following page. Table 5.16 shows for statement (a), the value of the sig.(2-tailed) is equal to 0.746 (>α). Hence, no significant difference in scores for respondents under 35 years of age, and those aged above 35 years (t(91)=0.325, two-tailed) was found. Also, the level of difference in the means (mean difference=-0.171, confidence interval =-1.217 to 0.875) is very small (0.0006). As for statement (b), the value of the sig.(2-tailed) is equal to 0.419 (>α). Hence, no significant difference in scores for respondents under 35 years of age, and those aged above 35 years was also found (t(91)=0.812, two-tailed), and the level of difference in the means (mean difference=-0.324, confidence interval =-1.117 to 0.469) was very small (0.0035). It also appears for statement (c) that the value of the sig.(2-tailed) is superior to α; and so, no significant difference in scores for respondents under 35 years of age, and those aged above 35 years was established (t(91)=0.688, two-tailed). Beside, the level of difference in the means (mean difference=0.294, confidence interval =-0.556 to 1.145) is very small (0.0013). Finally, statement (d) result show that a value of the sig.(2-tailed) >α. Consequently, no significant difference in scores for respondents under 35 years of age, and those aged above 35 years could be ascertained (t(91)=0.375, two-tailed). Furthermore, the level of difference in the means (mean difference=0.166, confidence interval =-0.715 to 1.047) is very small (0.0026). These results did not confirm the influence of age on environmental perception.

Table 5.16 - Statistical results for age and environmental perception

Environmental perception questions	Age	M	SD	Mean Difference	95% of Confidence interval of the Difference		Sig.(2-tailed)	t(91)
					Lower	Upper		
(a) It would be cost-effective for my organization to have pro-active environmental management policies	Under 35 year	5.06	2.269	0.171	-1.2	0.9	0.75	0.325
	Over 35 years	5.23	2.303					
(b) My organization is pro-active with environmental management issues	Under 35 year	3.79	1.647	-0.324	-1.1	0.5	0.42	0.812
	Over 35 years	4.12	1.925					
(c) Environmental management is an important issue for the development of my organization	Under 35 year	4.18	1.757	0.294	-0.6	1.1	0.49	0.688
	Over 35 years	3.88	2.085					
(d) Environmental education event(s) will improve employees knowledge in my workplace	Under 35 year	5.09	1.913	0.166	-0.7	1	0.71	0.375
	Over 35 years	4.92	1.937					

Moreover, responses from respondents regarding the three elements they regarded as the most influential factors for their organisation to adopt environmentally friendly practices, show that the respondents with the age median of 20 regard 'other factors' (47.1% of their sample) as the most influential factors for their organisations environmental policy. It is followed by two factors which scored the same (35.3%): 'managers' decision' and the legislation. Their third factor is 'to avoid liability costs for non-compliance'. However, respondents with the median age of 29.5 regard 'managers' decision' as the most important factor (49%). It is followed by 'the legislation' (37%) and by 'the community's pressure' (28.6%). As for respondents with a median age of 39.5, 'managers' decision' were chosen by 58.8% of the sample. It was followed by 'the legislation', 'the waste disposal', and 'the organisation's finance' which all scored 35.3%. Their third choice was 'the shareholders' pressures' and 'the moral factor' which all scored 23.5%. Respondents with a median age of 40.5 choose 'managers' decision', 'customers' pressure', 'the legislation' as their most important factor (40% of

the sample). It was followed by 'employees' pressures', community's pressure', 'shareholders' pressures', 'the waste disposal', 'to avoid liability' cost', 'the technology advancement', 'new market for green products', benchmark with other organisations' which all score 20%. Finally, respondents with a median age of 59.5 regarded 'the moral factor', 'the waste disposal', and the 'organisation finance' as their most important factors. Moreover, 20% of them consider that 'customers' pressures', 'the legislation', 'the information access', 'the new market for green products', and 'to benchmark with other organisations' as the second most important factors.

Although differences exist, the results do not establish a clear pattern regarding the environmental perception of younger versus older employees. Therefore, the above mentioned results lead to the rejection of $H_3 1.2_{Bis}$: *Older employees have better level of environmental perception than younger employees*; and the null Hypothesis $H_0 1.2_{Bis}$: *Older employees do not have a better level of environmental perception than younger employees* is accepted.

3. Parental status and environmental perception

Table 5.17 below shows that the value of the sig.(2-tailed) for statement (a) is equal to 0.05 (equal to α). As a result, there is a significant difference in scores for employees without children, and employees with children (t(91)=2.895, two-tailed).The level of difference in the means (mean difference=-1.658, confidence interval =-2.795 to -0.520) is also significant (0.8). As for statement (b), the sig.(2-tailed) value is >α. No significant difference in scores for non-parents, and for parents is found (t(91)=1.241, two-tailed). The level of difference in the means (mean difference=-0.56,

confidence interval =-1.457 to 0.337) is very small (0.017). With regard to statement (c), the value of the sig.(2-tailed) is equal to 0.00 (<α). There is a significant difference in scores for employees without children, and employees with children (t(91)=4.447, two-tailed). Moreover, the level of difference in the means (mean difference=-1.92, confidence interval =-2.778 to -1.062) is significant (0.17). Lastly, statement (d) results show a value of sig.(2-tailed) equal to 0.017 (<α). As such, a significant difference in scores for employees without children, and employees with children (t(91)=2.429, two-tailed) is found and the level of difference in the means (mean difference=-1.187, confidence interval =-2.157 to -0.216) is moderate (0.06).

Table 5.17 - Statistical results for parental status and environmental perception

Environmental perception questions	Parental status	M	SD	Mean Difference	95% of Confidence interval of the Difference		Sig.(2-tailed)	t(91)
					Lower	Upper		
(a) It would be cost-effective for my organization to have pro-active environmental management policies	Without children	4.79	2.384	-1.658	-2.795	-0.52	0.05	2.895
	With children	6.44	0.856					
(b) My organization is pro-active with environmental management issues	Without children	3.77	1.64	-0.56	-1.457	0.337	>α	1.241
	With children	4.33	2.029					
(c) Environmental management is an important issue for the development of my organization	Without children	3.75	1.701	-1.92	-2.778	-1.062	0	4.447
	With children	5.67	1.372					
(d) Environmental education event(s) will improve employees knowledge in my workplace	Without children	4.81	1.998	-1.187	-2.157	-0.216	0.017	2.429
	With children	6	1.09					

With regard to respondents' answers regarding the three factors they regarded as the most influential for their organisation to adopt environmentally friendly practices, respondents with children gave the following choice: (i) managers' decisions (50%), (ii) the legislation (38.89%), and (iii) either the

waste disposal cost (33.33%) or organisation finance (33.33%). Respondents with no children had the following selection: (a) managers' decisions (44%), (b) the legislation (34.7%), and (c) other factors (30.7%). It appears that managers' decisions and the legislation are selected by both groups. A two sample *t*-test between percentages to statistically confirm (or infirm) these findings was carried out. The *t*-statistic results are as follow: (i) managers' decisions (t(91)= 0.459; p=0.6471) (ii) the legislation (t(91)=0.334; p=0.7397). All results reveal a p-value greater than the alpha level (p>α). Therefore, the probability for the two *t*-tests to be a result of random chance is great, thus it cannot be confirmed that parental status influences environmental perception.

Although answers regarding the listing of three factors that the respondents considered as most influential for their organisations' environmental policies show inconclusive results, all of the other statistical results seem to establish a possible influence of parental status on environmental perception. Moreover, with all statements sig.(2-tailed) values inferior to 0.05 (except to (b) >α), the researcher considers that Hypothesis $H_3 1.5_{Bis}$: *Employees with kid(s) have a better level of environmental perception than employees without kid(s)* can confirmed. Hence the null Hypothesis $H_0 1.5_{Bis}$: *Employees with kid(s) do not have a better level of environmental perception than employees without kid(s)* is rejected.

4. Educational level and environmental perception

To enable statistical testing, employees' education levels are grouped into 2 categories: Those without a university degree, and those with a university degree. The results are presented in Table 5.18 below. As shown on Table

5.18 in the following page, the value of the sig.(2-tailed) for statement (a) is equal to 0.001 (<α). As a result, there is a significant difference in scores for employees without a university degree, and employees with a university degree (t(91)=2.372, two-tailed). Hence, the scale of the difference in the means (mean difference=-1.717, confidence interval =-2.729 to -0.706) is moderate (0.05). As for statement (b), sig.(2-tailed) is equal to 0.768 (>α). No significant difference in scores for respondents without a university degree, and the ones with a university degree is found (t(91)=0.295, two-tailed). Plus, the level of difference in the means (mean difference=-0.121, confidence interval =-0.937 to 0.695) is very small (0.0009). Statement (c) results show that the value of the sig.(2-tailed) column is equal to 0.931 (>α). Thus no significant difference in scores for respondents without a university degree, and the ones with a university degree is found (t(91)=0.086, two-tailed, also the level of difference in the means (mean difference=0.38, confidence interval =-0.837 to 0.913) is very small (0.000). Statement (d) results show a value of the sig.(2-tailed) column equal to 0.082 (>α). As such, no significant difference in scores for respondents without a university degree, and respondents who are university graduates (t(91)=1.76, two-tailed); and the scale of the difference in the means (mean difference=-0.788, confidence interval =-1.6777 to 0.101) is very small (0.033).

These results show that a difference exists between the respondents without a university degree (M=3.83 SD=2.582) and those with a university degree (M=5.55, SD=1.982; t(91)=2.372, two-tailed) with regards to statement (a).

Table 5.18 - Statistical results for education and environmental perception

Environmental perception questions	Education level	M	SD	Mean Difference	95% of Confidence interval of the Difference		Sig.(2-tailed)	t(91)
					Lower	Upper		
(a) It would be cost-effective for my organization to have pro-active environmental management policies	Not a university graduate	3.83	2.582	-1.717	-2.729	-0.706	0.001	2.372
	University graduate	5.55	1.982					
(b) My organization is pro-active with environmental management issues	Not a university graduate	3.79	1.841	-0.121	-0.937	0.695	0.768	0.295
	University graduate	3.91	1.695					
(c) Environmental management is an important issue for the development of my organization	Not a university graduate	4.13	1.541	0.38	-0.837	0.913	0.931	0.086
	University graduate	4.09	1.953					
(d) Environmental education event(s) will improve employees knowledge in my workplace	Not a university graduate	4.46	1.933	-0.788	-1.6777	0.101	0.082	1.76
	University graduate	5.25	1.874					

Furthermore, analysis for determining possible correlation between respondents' education level, and their perceptions of the three most influential factors on their organisations' environmental policies reveal interesting results. Indeed, analysis shows that the respondents without a high school degree believed 'other factors' (50%) was the most important factor. It was followed by 'organisation finance' (40%) and by either 'managers' decision', 'customers' pressures', 'shareholders' pressures' and 'costs for non-compliance' which all scored 30%. Respondents with a high school degree choose 'the legislation' (100%); and either 'the competition', 'community's pressures', cost for non-compliance', and 'other factors' which all scored 40%. Respondents with a college degree believe 'other factor' (58.33%) was the most important for their organisation's environmental policy. It was followed by 'community' pressures' (41.67%), and by 'managers' decisions' (25%). Respondents with an undergraduate degree selected the following: 'the

legislation' (51.72%), 'managers' decisions' (48%, and 'the waste disposal cost' (24.14%). Furthermore, respondents with Master's degree choices were: 'managers' decisions' (53.13%), 'the waste disposal cost' (34.38%), and either 'the moral factor' or 'the organisation finance' (both with a score of 31.25%). As for PhD holders, 'managers' decisions' was their first choice (62.5%). It was followed by either 'customers' pressures' or 'the legislation' (37.5%), and by either 'the competition', 'the moral factor', 'the cost for non-compliance', or 'other factors' (25%). These results offer no clear pattern which could establish an association between respondents' educational level and their environmental perception. Therefore, with all of the above results (and with only statement (a) sig.(2-tailed) value equal to 0.001), the researcher rejects Hypothesis $H_3 1.3_{Bis}$: *employees with higher education level have higher level of environmental perception.*

5. Job type and environmental perception

For facilitating statistical testing, employees' job types are grouped into 2 categories: Those with lower earnings in terms of salaries (example: a secretary) and those with higher earnings (example: an engineer). As shown from Table 5.19 in the next page, statement (a), no significant difference in scores is found for respondents holding lower paid job and respondents holding higher paid ones sig.(2-tailed) column is equal to $0.089>\alpha$; $t(91)=1.717$, two-tailed) and the level of difference in the means (mean difference=-0.803, confidence interval =-1.731 to 0.126) is very small (0.03). No significant difference in scores is also found for respondents holding lower paid job and the ones holding higher paid ones for statement (b). Indeed, the value of the sig.(2-tailed) column is equal to 0.551 ($>\alpha$). ($t(91)=-0.598$, two-

tailed), and the level of difference in the means (mean difference=-0.216, confidence interval =-0.932 to 0.501) is very small (0.004). Statement (c) results show that the value of sig.(2-tailed) is equal to 0.265 (>α) and the level of difference in the means (mean difference=-0.431, confidence interval =-1.195 to 0.332) is very small (0.014). Consequently, no significant difference in scores is found for respondents holding lower paid job and those holding higher paid ones (t(91)=1.122, two-tailed). As for statement (d), sig.(2-tailed) value is>α. Subsequently, no significant difference in scores for respondents holding lower paid job and those holding higher paid ones is found (t(91)=1.787, two-tailed). Moreover, the level of difference in the means (mean difference=-0.703, confidence interval =-1.485 to 0.078) is very small (0.014).

Table 5.19 - Statistical results for type of job and environmental perception

Environmental perception questions	Job earning	M	SD	Mean Difference	95% of Confidence interval of the Difference		Sig.(2-tailed)	t(91)
					Lower	Upper		
(a) It would be cost-effective for my organization to have pro-active environmental management policies	Lower earnings	4.75	2.489	-0.803	-1.731	0.126	0.089	1.717
	Higher earnings	5.55	1.903					
(b) My organization is pro-active with environmental management issues	Lower earnings	3.78	1.932	-0.216	-0.932	0.501	0.551	-0.598
	Higher earnings	4.00	1.448					
(c) Environmental management is an important issue for the development of my organization	Lower earnings	3.90	1.921	-0.431	-1.195	0.332	0.265	1.122
	Higher earnings	4.33	1.748					
(d) Environmental education event(s) will improve employees knowledge in my workplace	Lower earnings	4.73	1.930	-0.703	-1.485	0.078	0.077	1.787
	Higher earnings	4.73	1.930					

Also, when asked to list three factors that they regarded as the most influential factors for their organisations' adoption of environmentally friendly practices,

results show that the respondents working in lower paid jobs (secretarial activities) scored 50% with the following factors: 'managers' decision', 'employees' pressure', 'the legislation', shareholders' pressure', 'the waste disposal costs', and 'other factors'. Moreover, the respondents working in higher paid jobs (education sector, management sector) choose the following factors: 'managers' decisions' or 'the legislation' (38.1%), 'community's pressure' or 'other factors' (33.33%), and 'organisation finance' (28.57%). Furthermore, the respondents working in 'middle paid' jobs (retail sector) selected the following factors: 'managers' decisions' (48.98%), 'the legislation' (38.78%), and 'the waste disposal cost' (32.65%). These results do not provide a clear pattern establishing an association between 'job profession' respondents' answers. Moreover, the researcher applied, were possible, *t*-statistic test to detect possible correlation. All results revealed p value $p > \alpha$ which indicated that there was a high probability for such results to have occurred by chance; thus it is impossible to establish a correlation between the profession of an employee and his/her environmental perception.

These results provide conclusive evidence for the rejection of Hypothesis $H_3 1.4_{Bis}$: *The profession of employees do influence their level of environmental perception*; thus the null Hypothesis $H_0 1.4_{Bis}$: *Employees' profession have no influence on their level of environmental perception* - is retained

To conclude the environmental perception part, the researcher is not able to confirm (in general) the influence of Socio-demographic factors on environmental perception. However, it is established that there is a correlation

between people parental status and their perception of their organisation regarding: (i) the importance of environmental management for their organisation; (ii) the effectiveness in term of cost of their organisation environmental management policies; and (iii) the benefits of environmental education events at workplace on employee's environmental knowledge. Also, a correlation exists between respondents' (i) age (those aged 35 or under and respondents over 35 years old); (ii) education level (with or without a university degree); and (iii) parental status - and their feelings regarding the necessity for their organisations to do more for their environmental policies. Moreover, no correlation exist between respondents' education level and their environmental perception

5.4.3 Environmental behaviour (action)

Environmental behaviour score were assigned to respondents (between 1 to 5, 5 being the highest) based on their answers to environmental behavioural questions. Assigning a score (see appendix k) enabled the researcher to proceed with comparing employees' behavioural scores with their socio-demographics characteristics. Furthermore, to determine whether there is a statistically significant difference between the mean scores for the respondents' Socio-demographic factors and their environmental behaviour/action, numerous independent-samples *t*-tests were conducted to compare environmental behavioural scores with respondents' socio-demographic factors. The process involved testing whether the null Hypotheses regarding the two unrelated groups were equal to the formulated Hypotheses. All the test results are presented and analysed below.

1. Gender and environmental behaviour

Table 5.20 below shows that there is no significant difference in scores for males and females as associated p-values were all greater than 0.05. Moreover, the two effects sizes which measure the level of mean differences for independent-samples (Eta) are both equal to 0.02 (behavioural at personal level and at workplace). Consequently, the null Hypothesis ($H^0_{Behav}1.1$- *Gender doesn't have a positive influence on environmental behaviours*: $u_1 = u_2$) is not rejected while the initial Hypothesis ($H_{Behav}1.1$ - *Gender has a positive influence on environmental behaviours*: $u_1 \neq u_2$) is rejected.

Table 5.20 - Test results for gender and environmental behaviours

Independent Sample Test										
		Levene's test for equality of variance		T-test for equality of Means						
									95% Confidence interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std error Difference	Lower	Upper
Environmental score at personal level	Equal variance assumed	0,724	0,397	-1,210	91	0,229	-0,247	0,204	-0,652	0,158
	Equal variance not assumed			-1,218	86,085	0,226	-0,247	0,202	-0,649	0,156
Environmental Score at Workplace	Equal variance assumed	0,933	0,337	1,408	91	0,162	0,274	0,195	-0,113	0,661
	Equal variance not assumed			1,397	81,626	0,166	0,274	0,196	-0,116	0,664

2. Age and environmental behaviour

Table 5.21 in the next page shows that there is no significant difference in scores for respondents aged 35 years or under and those aged above 35 years or over as associated p-values are all greater than 0.05. Moreover,

additional 'effects sizes' tests for independent-samples (Eta) equal to 0.00 for behavioural at personal level and 0.00 for behavioural at workplace. These results reject Hypothesis $H_{Behav}1.2$: *Age has a positive influence on environmental behaviours.*

Table 5.21 - Test results for age and environmental behaviours

Independent Sample Test										
		Levene's test for equality of variance		T-test for equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std error Difference	95% Confidence interval of the Difference	
									Lower	Upper
Environmental score at personal level	Equal variance assumed	1,109	0,295	-0,117	91	0,908	-0,026	0,227	-0,477	0,424
	Equal variance not assumed			-0,108	39,769	0,914	-0,026	0,244	-0,519	0,466
Environmental Score at Workplace	Equal variance assumed	1,716	0,194	-0,003	91	0,998	-0,001	0,217	-0,432	0,431
	Equal variance not assumed			-0,003	49,869	0,998	-0,001	0,208	-0,418	0,417

3. Job type and environmental behaviour

Table 5.22 in the following page shows that there is no significant difference in scores for respondents with different job types, hence different earnings as associated p-values are all greater than 0.05. Moreover, the two effects sizes for independent-samples (Eta) equal to 0.003 for behavioural at personal level and 0.037 for behaviour at workplace. As a result, the null Hypothesis $H^0_{Behav}1.3$: *The profession of people does not have a positive influence on environmental actions and behaviours* is accepted

Table 5.22 - Test results for work profession and environmental behaviours

Independent Sample Test										
		Levene's test for equality of variance		T-test for equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std error Difference	95% Confidence interval of the Difference	
									Lower	Upper
Environmental score at personal level	Equal variance assumed	1,237	0,269	0,501	91	0,618	0,102	0,204	-0,303	0,508
	Equal variance not assumed			0,506	90,203	0,614	0,102	0,202	-0,299	0,504
Environmental Score at Workplace	Equal variance assumed	1,673	0,199	1,874	91	0,064	0,360	0,192	-0,022	0,741
	Equal variance not assumed			1,875	87,647	0,064	0,360	0,192	-0,022	0,742

4. Education and environmental behaviour

Table 5.23 in the next page shows that a significant difference in scores for employees with a university degree and those without a university degree exist with regard to their behaviour at personal level [i.e. Sig. (2-tailed) equals to 0.032, t(91) equal to 2.172, the level of difference in the means (mean difference=0.-0.493 was small (0.049), confidence interval =-0.943 to -0.043]. Moreover, no significant difference in scores for employees with a university degree and those without a university degree was found for behaviour at their workplace as the associated p-value was equal to 0.537 (>0.05). Also, the effect size for independent-samples (Eta) were very small i.e. 0.004 for behaviour at personal level and 0.037 for behaviour at workplace level. These results provide conclusive evidence for the confirmation of Hypothesis $H_{Behav}1.4$: *The education level of people has a positive influence on environmental actions and behaviours* at personal level; thus rejecting the null

Hypothesis $H^{0}_{Behav}1.4$: *The education level of people does not have a positive influence on environmental actions and behaviours.* However, the evidence also confirms the rejection of $H_{Behav}1.4$ at organisational level.

Table 5.23 - Test results for education and environmental behaviours

Independent Sample Test										
		Levene's test for equality of variance		T-test for equality of Means						
									95% Confidence interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std error Difference	Lower	Upper
Environmental score at personal level	Equal variance assumed	,331	,567	-2,174	91	,032	-,493	,227	-,943	-,043
	Equal variance not assumed			-2,210	41,361	,033	-,493	,223	-,943	-,043
Environmental Score at Workplace	Equal variance assumed	4,094	,046	-,620	91	,537	-,138	,222	-,579	,304
	Equal variance not assumed			-,703	51,915	,485	-,138	,196	-,531	,255

5. Parental status and environmental behaviour

Table 5.24 in the next page shows that there is no significant difference in scores for employees with children and those without as associated p-values were all greater than 0.05. Moreover, the two effects sizes for independent-samples (Eta) are 0.005 for behavioural at personal level and 0.001 for behaviour at workplace. Hypothesis $H_{Behav}1.5$: *The parental status of individuals has a positive influence on environmental actions and behaviours* is therefore rejected.

Table 5.24 - Test results for parental status and environmental behaviour

Independent Sample Test										
		Levene's test for equality of variance		T-test for equality of Means						
									95% Confidence interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std error Difference	Lower	Upper
Environmental score at personal level	Equal variance assumed	,152	,698	-,380	91	,705	-,098	,257	-,609	,413
	Equal variance not assumed			-,379	25,720	,708	-,098	,258	-,628	,433
Environental Score at Workplace	Equal variance assumed	,091	,764	-1,172	91	,244	-,287	,245	-,773	,199
	Equal variance not assumed			-1,247	27,899	,223	-,287	,230	-,758	,184

Moreover, as it is important to confirm the validity of behavioural scoring method used during the statistical testing, numerous independents t-tests were carried out for each of the questionnaire behavioural questions at personal level (for the gender perspective only) to confirm the findings (see Appendix J). The tests results revealed similar scores for males and females as associated *p*-values were all greater than 0.05 and all effect size calculations for determining the level of difference between the two groups were either very small (less than 0.01) or they were moderate ($0.06 \geq Eta \leq 0.14$).

However, when asked whether they keep themselves up-to-date regarding environmental issues, the results show *p* value which is below 0.05. It means that there was a statistical and significant difference in the mean scores of males and females (see Table 5.25, next page). Moreover, the *p* value was $p=0.039 < 0.05$ (α). As a consequence, the same test was extended for other

socio-demographic factors for question 27: 'do you keep yourself up-to-date regarding environmental issues?' All test results for other socio-demographic factors revealed p-values greater than 0.05. As a result, it is concluded that gender plays a role on people's decisions to stay informed regarding environmental issues.

Table 5.25 - t-Test results regarding respondents keeping up-to-date with environmental issues

Independent Sample Test										
		Levene's test for equality of variance		T-test for equality of Means						
									95% Confidence interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std error Difference	Lower	Upper
Do you Keep yourself Informed regarding Environment issues? Yes=1; No=0	Equal variances assumed	2,61	0,11	-2,092	91	0,039	-0,216	0,103	-0,421	-0,011
	Non-assumed equal variance			-2,103	85,626	0,038	-0,216	0,103	-0,42	-0,012

To conclude the analysis of data on socio-demographic factors and EA, numerous statistical tests analysed the respondents' environmental knowledge, perception, and their behaviours (the three essentials factors of environmental awareness). As such, the statistical analyses were necessary as Hypothesis *$H_3$3: There is a correlation between socio-demographic variables (gender, age, profession, parental status, education level) and environmental awareness* - could only be confirmed if there was sufficient statistical evidence to establish the influence of socio-demographic factors on all of the following: (a) environmental knowledge; (b) environmental

perception; and (c) environmental actions. However, the statistical tests did not provide evidence to confirm the Hypothesis. As a result, *$H_3$3* is rejected. Furthermore, Hypothesis *$H_2$2: There is a correlation between environmental awareness and people's social status* - were tested throughout this section and were also rejected. Moreover, Hypothesis *$H_3$2: Organisations' employees are environmentally aware* was rejected as statistical results shows that respondents lacked one or more of the following: environmental knowledge, environmental perception, and environmental actions (i.e. the three components are require to be environmentally aware). The following section will focus statistical test regarding possible association between environmental education and environmental behaviours.

5.5 ENVIRONMENTAL EDUCATION AND PRO-ACTIVE ENVIRONMENTAL ACTIONS

Assuming environmentally educated individuals take proactive environmental actions means such individuals do so at their workplace and outside work (which justify Hypotheses *$H_3$2.1* and *$H_3$2.2*). Prior to determining environmentally educated individuals' actions (at personal and work level), it is useful to stress that the assessment of the respondents' environmental knowledge was based on factors presented earlier under the environmental knowledge section. Moreover, having established that none of the respondents provided correct answers to all environmental questions, the researcher proceeded with the allocation of an environmental knowledge

score (between 1 to 5, 5 being the highest) based on the same principles developed in the previous section for environmental behaviour. Furthermore, statistical Chi-square tests were applied to determine whether the two categorical variables (environmental knowledge and environmental behaviour) were related.

Table 5.26 in the following page summarises the results of possible correlation between environmental education and behaviours at personal and workplace level. The two Chi-square tests show that the research has violated one of the assumptions of Chi-square concerning the minimum expected cell frequency (80% of cells have expected frequencies of 5 or more). Therefore, the Chi-square tests were not valid. It was therefore adequate to use the independent t-tests to compare behavioural scores for environmentally knowledgeable respondents, against the scores of the respondents who were not environmentally educated. The values of Sig. (2-tailed) were higher than 0.05 (i.e. 0.177 and 0.092). As a result, there were no significant differences in scores for environmentally knowledgeable respondents (M=2.62, SD=0.921) and those who were not environmentally knowledgeable (2.29, SD=0.985; t(91)=1.359; p=0.11, two-tailed). The level of difference in the mean (mean difference=0.327; CI:-0.151 to 0.806) was high (eta squared=0.99). These results were inconclusive. Thus, Hypotheses *$H_3$2.1: Environmentally educated people take pro-active environmental actions at personal level* and *$H_3$2.2: Environmentally educated employees take pro-active environmental actions at their workplace* cannot be confirmed.

Table 5.26 - Behaviours at personal level and at workplace

	Chi-square Tests			
		Value	df	Asymp. Sig. (2-sided)
Behaviours at personal level	Pearson Chi-Square	2,530[a]	4	0,639
	Likelihood Ratio	2,741	4	0,602
	Linear-by-Linear Association	1,831	1	0,176
	N of Valid Cases	93		
	. 4 cells (40%) have expected count less than 5. The minimum expected count is 0.23			
Behaviours at their workplace	Pearson Chi-Square	6,103[a]	3	0,107
	Likelihood Ratio	5,298	3	0,151
	Linear-by-Linear Association	2,847	1	0,092
	N of Valid Cases	93		
	. 3 cells (37.5%) have expected count less than 5. The minimum expected count is 2.71			

5.6 ORGANISATIONS AND ENVIRONMENTAL MANAGEMENT

Chi-square for independence and Spearman's rank Order correlation (where required) were used to explore the relationship between each of the following criteria and employees' perceptions of their organisation:

- Availability of environmental management policies
- Staff requirement to be aware of environmental policy (ies)
- Promotion of environmental policies/information amongst employees at workplace level

- The collection of feedback from employees regarding environmental measures

5.6.1 Respondents' perceptions of their organisations' environmental policies

This part consists essentially of testing *$H_3$5: Sustainable organisations have a better reputation and image among their employees*. The results are presented on Table 5.27 and Table 5.28 below.

Table 5.27 in the next page shows that 2 cells have an expected count of less than 5. Therefore, Chi-square is deemed not appropriate for the test. As a result, the researcher proceeded with a Spearman's rank Order correlation which statistical test result shows a Sig. (2-tailed) value equal to 0.584 which is superior to 0.05. Therefore, it can be concluded that no correlation exists between employees' perception of their organisations and their workplace environmental policies. Also, no correlation exists between employees' perception of their organisations and their workplace requirements regarding environmental policies.

Table 5.27 - Chi-square and Spearman' tests results of employees' perception of organisations' environmental policies

CHI SQUARE TESTS

		Pearson Chi-Square	Likelihood Ratio	Linear-by-Linear Association	N of Valid Cases	a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 11.29.	b. Computed only for a 2x2 table
Employees' perception of organisations' environmental policies	Value	2.391[a]	2.442	2.366	93		
	df	1	1	1			
	Asymp. Sig. (2-sided)	0.122	0.118	0.124			
		Pearson Chi-Square	Likelihood Ratio	Linear-by-Linear Association	N of Valid Cases	a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is .45.	
Employees' perception of their organisations' requirements regarding environmental policies	Value	.921[a]	1.299	0.503	93		
	df	2	2	1			
	Asymp. Sig. (2-sided)	0.631	0.522	0.478			

SPEARMAN'S RANK ORDER CORRELATION

	Spearman's rho					
	Employees perception of their environmental credentials			Are you required to be aware of environmental policy(ies)?		
	Correlation Coefficient	Sig. (2-tailed)	N	Correlation Coefficient	Sig. (2-tailed)	N
Are you required to be aware of environmental policy (ies)?		0.584	93	1	.	93

Chi-square test results from Table 5.28 in the following page shows that 2 cells have an expected count of less than 5. Therefore, the researcher proceeded with a Spearman's rank Order correlation which results show *p* values (Sig. (2-tailed) equal to 0.208 which are superior to 0.05. Subsequently, it cannot be confirmed that a correlation exists between employees' perception and their workplaces' (i) internal promotion of environmental policy; and (ii) collection of environmental feedback(s) among employees.

Table 5.28 - Chi-square and Spearman' tests results of employees' perception of promotion of environmental policies, collection of feedbacks at their workplace

CHI SQUARE TESTS

		Pearson Chi-Square	Likelihood Ratio	Linear-by-Linear Association	N of Valid Cases	a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 9.03.	b. Computed only for a 2x2 table
Promotion of organisations' environmental policy and employees' perception of their workplace	Value	1.062[a]	1.079	1.051	93		
	df	1	1	1			
	Asymp. Sig. (2-sided)	0.303	0.299	0.305			
		Pearson Chi-Square	Likelihood Ratio	Linear-by-Linear Association	N of Valid Cases	a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 4.97.	b. Computed only for a 2x2 table
Collection of environmental feedback from employees and employees' perception of their workplace	Value	1.612[a]	1.681	1.595	93		
	df	2	2	1			
	Asymp. Sig. (2-sided)	0.204	0.195	0.207			

SPEARMAN'S RANK ORDER CORRELATION

	Spearman's rho					
	Employees perception of their environmental credentials			Feedbacks?		
	Correlation Coefficient	Sig. (2-tailed)	N	Correlation Coefficient	Sig. (2-tailed)	N
Employees perception of their environmental credentials	1	.	93	0.132	0.208	93
Feedbacks?	0.132	0.208	93	1	.	93

Table 5.27 and Table 5.28 show *p*-values which are all superior to 0.05. Consequently, the Hypothesis *$H_3$5: Sustainable organisations have a better reputation and image among their employees* is rejected.

5.6.2 Organisations environmental facilities and activities

This part consists essentially of testing Hypothesis $H_3$6: *Environmental facilities available at work and environmental activities conducted at workplaces for the enhancement of environmental awareness of employees are sufficient.* The questionnaire responses show that 41% of the 93 respondents said that their workplaces had double glazed windows and 59% had single glazed ones. Moreover, 27% said that they work for an organisation with an explicit environmental management policy, 58% said they work for an organisation with no environmental policy, while 25% did not know whether their organisations had or not an explicit environmental policy. Also, only 24% of the respondents said that their organisation environmental policy was published. Only 13% of the respondents said that their workplaces required them to be aware of their environmental policy, while 71% said they were not required by their organisations to be aware of any environmental policy and 16% stated that they did not know whether or not they were required to be aware of such policy. Finally, only 4.3% of the respondents said they had a designated individual/department which dealt with environmental issues within their organisations.

Moreover, in terms of environmental actions at workplace, Table 5.29 in the following page shows that 48.39% of the respondents worked for organisations that encouraged at least recycling. Besides, 34.4% of the respondents worked for organisations that encouraged at least energy saving. Furthermore, 34.4% of the respondents' workplaces encouraged at least waste reduction, while 12.9% of the respondents' organisations encouraged at

least the use of public transport, and 12.9% of the respondents' workplaces encouraged donation to environmental projects.

Table 5.29 - Respondents' organisations' environmental actions

Environmental actions	Male	Female	Total	Total in %
Energy saving	17	15	32	34.4%
Waste reduction	17	15	32	34.4%
Use of public transportation	6	6	12	12.9%
Green purchasing strategies	3	2	5	5.37%
Donation to environmental projects	7	5	12	12.9%
Attending environmental education projects	3	4	7	5.53%
Water saving facilities	2	4	6	6.45%
Recycling	19	26	45	48.39%
Car-sharing	4	7	11	11.83%
None	4	4	8	8.6%
Other	0	0	0	0

As for the recycling facilities, Table 5.30 below shows that 'paper recycling' is the only recycling activity available at the majority of the respondents' workplaces (53.8%). Also, 35.5% of the respondents stated that cardboard recycling was available at their workplaces, while 33.33% confirmed that their organisations had recycling facilities for only plastic wastes. See Table 5.30 for the complete least of recycling facilities at respondents' workplaces.

Table 5. 30 Respondents workplaces' recycling facilities

Recycling facilities at workplaces	% of respondents
(a) availability of at least paper recycling facility	53.8%
(b) availability of at least cardboard recycling facility	35.5%
(c) availability of at least plastic recycling facility	33.33%
(d) availability of at least can recycling facility	28%
(e) availability of at least stationeries recycling facilities	16.1%
(f) availability of at least electronics recycling facility	14%
(g) availability of at least batteries recycling facility	9.7%
(h) availability of at least organics recycling facility	7.5%
(i) availability of at least cartridges recycling facility	7.5%
(j) availability of at least other recycling facilities	3.2%

Also, when asked to identify the means used by their organisations to promote their environmental policy, 7.44% of the respondents said that their organisations rely mostly on media for their environmental policy promotion (mostly through advertisement). It is followed by the use of employees (5.58%), university training (2.79%), in-house consultant (2.79%), seminars (1.86%), use of suppliers (1.86%), implementation of ISO 14000 standards (0.93%), external consultant (0.93%), other means (0.93%). Thus, it seems that the promotion of environmental policies is not one of the priorities of most of the organisations for which this study respondents worked.

As for respondents' views regarding their organisations' environmental facilities and activities, they regarded waste generation as the main environmental issues their organisations face. It is followed by heating, light pollution and indoor air quality. When asked if they considered their workplaces environmentally friendly, over 65% said 'no'. Furthermore, when asked whether they felt more is needed to be done regarding their organisations' environmental policy, 55% (24 males and 27 females) said 'yes', while 45% said 'no'. Also, a statistical confidence interval (CI) around a percent with a desired confidence interval of 10% was used by the researcher to indicate the reliability of his estimate. The result shows a standard error of the proportion of 0.05. This means that Hypothesis *H_36: Environmental facilities available at work and environmental activities conducted at workplaces for the enhancement of environmental awareness of employees are sufficient* is rejected. Furthermore, Hypothesis *H_34: Organisations use their employees to promote sustainability among staff* is confirmed because

employees use for environmental promotion was one of the most used means for environmental promotion (5.58%) right after media use (7.44%).

5.6.3 Organisations' Environmental Facilities/Activities and Employees Environmental Awareness

This part consists essentially of testing Hypothesis *$H_3$7: There is a correlation between environmental facilities and activities available at organisations' workplace and their employees' Environmental Awareness.* The aim is to establish whether or not an association can be established between the environmental facilities available at organisations and their employees' Environmental Awareness. As such, non-parametric binomial test is used to analyse differences in two variables scores (organisations with environmental facilities and organisations without environmental facilities). The binomial test is applied to determine if the proportion of organisations in one of two categories was different from a specified amount (0.5).

The results presented under Table 5.31 below show a satisfactory exact Sig. (2-tailed) which is equal to 0.000. A satisfactory binomial test means a Spearman's rank Order correlation test can be carried out to determine the relationship between environmental facilities and activities, and environmental awareness (using respondents Environmental Awareness scores).

Table 5.31 - Binomal test for Environmental Facilities and Employees' Environmental Awareness

		Category	N	Observed Prop.	Test Prop.	Exact Sig. (2-tailed)
ENVIRONMENTAL FACILITY	**Group 1:** Not enough environmental facilities	Not sufficient	82	.88	.50	.000
	Group 2: Enough environmental facilities	sufficient	11	.12		
	Total		93	1.00		

Table 5.32 shows the result for the Spearman's rank correlation test. The Table results show *p* values (i.e Sig. (2-tailed) of 0.722 which are both superior to α. Moreover, Spearman's correlation coefficient (r_s) is 0.37 which means that there is a negative correlation between the two variables (environmental facilities and Environmental Awareness). Therefore a possible correlation between organisations' environmental facilities and employees' Environmental Awareness is statistically not significant.

As for the possible correlation between environmental activities and Environmental Awareness, Table 5.32 in the following page shows that *p* values (i.e Sig. (2-tailed) of 0.913 which are both superior to α. Moreover, Spearman's correlation coefficient (r_s) is -0.012 which means that there is a negative correlation between the two variables (environmental activities and Environmental Awareness). As a result, one can confirm that the claim for a possible correlation between organisations' environmental activities and employees' Environmental Awareness is statistically not significant. Table 5.32 results (*p* values (Sig. (2-tailed) are > to α) provide conclusive evidence for Hypothesis H_37: *There is a correlation between environmental facilities and activities available at organisations' workplace and their employees' Environmental Awareness* to be rejected.

Table 5.32 - Spearman's rank correlation between environmental facilities & activities and employees' Environmental Awareness

			Environmental Facilities Scores	Environmental Aware?
Spearman's rho	Environmental Facilities Scores	Correlation Coefficient	1	0.037
		Sig. (2-tailed)	.	0.722
		N	93	93
	Environmental Aware?	Correlation Coefficient	0.037	1
		Sig. (2-tailed)	0.722	.
		N	93	93
			Environmental Activities?	Environmental Aware?
Spearman's rho	Organisations' Environmental Activities? It Does Not	Correlation Coefficient	1	-0.012
		Sig. (2-tailed)	.	0.913
		N	93	93
	Environmental Aware?	Correlation Coefficient	-0.012	1
		Sig. (2-tailed)	0.913	.
		N	93	93

To summarise this section, all statistical tests give evidence to confirm the rejection of:

- Hypothesis *$H_3$1: Complying with Environmental Regulation is the main reason why organisations implement environmental requirements*,
- Hypothesis *$H_3$5: Sustainable organisations have a better reputation and image among their employees*,
- Hypothesis *$H_3$4: Organisations use their employees to promote sustainability among staff*, and
- Hypothesis *$H_3$7: There is a correlation between environmental facilities and activities available at organisations' workplace and their employees' Environmental Awareness.*

Indeed, the statistical tests show *p* values > to α thus making it impossible to confirm these Hypotheses.

However, data analysis provided conclusive evidence for the rejection of Hypothesis *$H_3$6: Environmental facilities available at work and environmental activities conducted at workplaces for the enhancement of environmental awareness of employees are sufficient.*

5.7 CONCLUSION

This chapter has presented the results of the questionnaire data collected for the purpose of this research. Numerous statistical methods, all widely used in social sciences research have been carried out in this study. The results are presented in Tables and briefly interpreted. This study makes significant findings at employee level and at organisational level. At employee level, the main findings are: (i) most of the respondents are not environmentally aware; (ii) many of the respondents have an acceptable environmental behaviour; (iii) gender does not influence EA; (iv) age in some circumstances plays an influential role in people's environmental knowledge and perception; (v) there is a significant difference between parents' perception of their organisations' environmental policies and respondents without children; (vi) there is a significant association between respondents' education and their EA and behaviour; and (vii) respondents' earnings (or profession) do not affect their EA and behaviour. At organisation level, the main findings are: (a) organisations have insufficient environmental facilities and activities; (b) there is inconclusive statistical evidence to corroborate a link between lack of

environmental facilities and activities at workplace and employees' EA; (c) employees would like to see more environmentally friendly actions in their workplaces; and (d) 'legislation' is not the main reasons why organisations adopt pro-environmental policies. All of these findings will be discussed in the next chapter.

CHAPTER SIX

DISCUSSION OF THE RESULTS

6.1 INTRODUCTION

This chapter provides an analysis and discussion of the findings presented in chapter five. It attempts to explain the outcome of this study by linking the findings within the perspectives discussed earlier in chapter two. These perspectives include: (i) the three dimensions of sustainability (represented in Figure 2.1) which are the ecology (e.g. the natural resource, goods and services and the carrying capacity of the planet), the social (e.g. environmental justice, gender influence on sustainability, environmental education) and the economic (e.g. environmental impact assessment, sustainability reporting); and (ii) environmental awareness (which is shaped by a wide range of factors (e.g. environmental education and knowledge, culture, environmental attitude, environmental behaviour; the social position, and value) (see Figure 2.3), and environmental behaviour (which is regarded as being directly influenced by cultural (e.g. value, beliefs and attitudes) and educational elements. The chapter also attempts to discuss the findings in relation to existing theories on environmental awareness and behaviours which are discussed in chapter 3. Some of the theories included: (a) the socio-demographic influential factors (social status, race, gender, sexuality,

individual's 'positionality') as a solution to environmental issues; and (b) engaging the general public and organisations for greater participation to environmental sustainability. Moreover, the chapter attempts to examine possible correlation between five specific socio-demographic factors (gender, age, parental status, education and profession/job type/income) and their environmental awareness (which is defined in relation to environmental knowledge, environmental perception and environmental behaviour). The general approach adopted here is offering the interpretation of the results with the research questions in mind, then relating it to the research's hypotheses, and discussing them in relation to previous findings and/or conclusions discussed in the literature review chapter. In order to achieve these objectives, the sections within this chapter are organised as follow: socio-demographic elements (gender, age, parental status, education level and profession) correlation with environmental awareness are discussed in section 6.2, while section 6.3 looks at the relation between environmental education and environmental actions. Section 6.4 focuses on organisations and environmental management, and the chapter concludes in section 6.5 with a summary of the main points.

6.2 THE INFUENCE OF SOCIO-DEMOGRAPHIC FACTORS ON ENVIRONMENTAL AWARENESS

In chapter 3, it was observed that emerging theories of environmental awareness have established that socio-demographic factors influence individuals' perception, knowledge and experience with regard to

environmental management (Shabina, 1999; Lizuka, 2000; Turner and Pei Wu, 2002; OECD, 2008; Kollmuss and Agyeman, 2010; Baruah *et al.*, 2011). This study attempted to examine possible correlation between five specific socio-demographic factors (gender, age, parental status, education and profession/job type/income) and their environmental awareness. Environmental awareness is defined in relation to three elements: knowledge, perception and behaviour. In other words, this study attempted to establish possible correlation between these socio-demographic characteristics and respondents' (i) environmental knowledge; (ii) environmental perception; and (iii) environmental behaviours.

6.2.1 Environmental Awareness

The findings in relation to the influence of socio-demographic factors on environmental awareness demonstrate that environmental behaviour is adopted by most of the respondents. Moreover, the fact that most of them (80%) recycle because they wish to save the environment shows that they believe in the existence of an environmental problem that needs to be addressed. This finding is in line with Kessel (1985) whose study shows that 80% of people believe environmental pollution is increasing dangerously. However, results from environmental knowledge questions show that none of the respondents did answer all environmental questions correctly and only 46% of males and 56% of females can answer correctly the majority of the questions. Therefore, it can be argued that people's environmental action is acceptable and probably will grow (most people start recycling less than 10 years ago), and in the coming year it can be expected that these individuals will pass their environmental behaviour to future generations as ascertained

by Casimir and Dutilh (2003) and by the OECD (2008). Without environmental knowledge which supposes validating the literacy concepts developed by Roth (1992), Loubster *et al.* (2001) and by the Environmental Literacy Committee (2003) (see Table 2.4), it is impossible to claim that the respondents were environmentally aware although they displayed environmentally friendly behaviours. As a result, hypothesis *$H_3$2: Organisations' employees are environmentally aware* is rejected. This result is in contrast with Kessel (1985: 110) findings which established that there was a high degree of general environmental awareness among British people. However, it supports Gadenne *et al.*'s (2009) findings that people and organisations have little awareness of the environmental issues including the benefits that might arise from their environmentally friendly practices. Having established that respondents in this study were not environmentally aware, but that they display acceptable environmental behaviour, the following parts will discuss the findings regarding the socio-demographic influences on environmental awareness and actions.

6.2.2 Gender and Environmental Awareness

As reported in chapter five, the results of the study showed that 43% of the respondents were males and 57% were females. All statistical tests analysis calculating the *p*-values (which determine whether a hypothesis can be accepted or rejected) for possible relationship between socio-demographic factors and (i) environmental knowledge; (ii) environmental perception; and (iii) environmental actions - revealed *p*-values greater than 0.05. These results lead to the statistical conclusion that:

(1) Although there is a slight difference in female and male mean score regarding environmental knowledge, with females having a higher mean score, it can be concluded from the statistical results the difference is not significant. As a result, it is concluded that gender has no effect on people's environmental knowledge. A similar finding was obtained by Flynn *et al.* (1994) who found that no gender difference exists regarding environmental knowledge. Also, the finding corroborate with Ajiboye and Silo (2008) findings in their environmental knowledge research conducted in Botswana which concluded that no difference existed between their male and female respondents. However, this research finding opposes Banerjee and McKeage (1994) who assert that females are more environmentally conscious than men. This finding is also in contrast to the OSCE's (2009) statement that men and women have different socio-cultural construction which means they have different knowledge and attitude toward the environment. Also, it does not support McCright (2010) who studied eight years of Gallup data in the USA and found that women convey greater environmental knowledge than men.

(2) There are no significant differences between males and females with regards to environmental perception. This finding is in line with Akomolafe (2011) research on influential factors on environmental knowledge in Nigeria. It was found that gender had not been an important factor in environmental perception. However, it is in contradiction with Flynn *et al.*'s (1994) postulation that women's perception of environmental risk tends to be higher than men. It is also

contrary to Guagnano (1995) and Eurobarometer (2005) studies which established that females had a better perception of environmental issues than their male counterparts. Moreover, this result contradicts McCright's (2010) findings that women convey greater environmental perception than men.

(3) There are no significant differences between males and females with regards to environmental behaviours. This result matches a Canadian study by Eagles and Muffitt (1990) as well as D'Sousa *et al.* (2007) research findings that there is no relationship between gender and environmental action. It also supports Akomolafe's (2011) assertion that gender has no influence on people's environmental behaviour, and Chen and Chai (2010) research on gender influence on green purchasing that found that there is no significant difference between male and female regarding their environmental behaviour. However, this finding is contrary to Shabina's (1999) conclusion that gender influences environmental behaviour. It is also contrary to findings from Kollmuss and Agyeman (2002), Shobeiri *et al.* (2006) and the OSCE (2009) who all confirm that a significant difference in the level of environmental behaviour exists between males and females.

The above findings which do not establish an influence of gender on environmental awareness and behaviour are consistent with Lizuka's (2000: 19) view which claims that any postulation confirming the influence of gender on environmental awareness should be examined with caution. However, these findings are in disagreement with the general belief that women tend to

be more environmentally aware than men (see Martine, 1997; Nieves Rico, 1998; Agarwal, 2000; UNESCO, 2002; Johnsson-Latham, 2007; OECD, 2008; Agostino, 2010; Aminrad *et al.*, 2011; Learned, 2011) or with Baruah *et al.* (2011) whose investigation of environmental awareness among Indian workers regarding local issues conclude that a significant evidence existed to prove a difference in environmental awareness between males and females. A key issue is whether theories advocating for population 'segmentation' on the basis of their gender are effective in the fight against environmental degradation. It is commonly accepted that males and females have different psychological make-up (see OSCE, 2009; Kollmus and Agyeman, 2010) and psychology was cited as one of the factors influencing the decision making process for adopting environmentally friendly behaviour. This study asserts that there might be peculiar differences between male and female respondents and that gender may still influence (although slightly) individual's environmental awareness. However, in defining factors influencing environmental awareness, Lizuka (2000) did not include gender as one of the factors in his study. Thus, this research finding may be evidence, which explains Lizuka's exclusion of gender as an important and influential factor with regard to environmental awareness. In conclusion, it is reasonable to argue in favour of a non-gender influence on environmental.

6.2.3 Age and Environmental Awareness

Calculations of statistical *p*-values in order to determine if respondents' age influences their environmental awareness show that age can play a determinant role in people's environmental management. The study results are presented as follows:

(1) With regard to environmental knowledge, analysis of this study's results shows that older respondents answered more accurately the environmental questions than younger ones. This confirms Roberts's (1996) conclusion that older people are more environmentally knowledgeable than the younger ones. Likewise, statistical *t*-test analysis produces mixed *p*-values results — some were greater than 0.05 while some were less than 0.05. With *p*-values not pointing in the same direction, the following interpretation is made: there is statistical evidence to confirm that age plays an influential role in the level of environmental knowledge but only between individuals aged between 20 to 60. Not enough statistical evidence is found to extend this finding to other age groups (below 20 years old or above 60 years old). This finding provides evidence which confirms and rejects some of the previous studies (see Dunlap and Van Lier, 1980; Roberts, 1996; Straughan and Roberts, 1999).

(2) As for the respondents' environmental perception, statistical tests also show mixed *p*-values results. Some of this study results confirm theories from Straughan and Roberts' (1999) investigation of college students' environmental consciousness and behaviour which concludes that younger people are more likely to be more environmentally aware than older ones. The result also confirms Soonthonsmai's (2001) view that an environmental perception is influenced by an individual's age. However, some of the *p*-values results reject the above-mentioned theories, thus agreeing with Dunlap and Van Lier's (1980: 183)

assertion that age is negatively associated with environmental perception. The confusion created could be explained by the fact that more than 71% of this research's respondents had a median age of 29.5 or under; while only 29.1% had a median age above 29.5. Therefore, the sample was not equal and as such could explain the result confusion. Another explanation could be the one given by Patchen (2006) who states that in Europe knowledge among different age groups varies by issues. Thus, some of this study respondents might be better informed regarding some specific environmental issues presented in this study's questionnaire and as such achieve a better score than a different age group which the research's questions was not an area of interest (regarding environmental issues).

(3) Analysis of environmental behaviour results shows that no significant differences in scores exist between respondents aged 35 years or under and those aged 35 years and over (.i.e. all associated p-values are greater than 0.05). This is in contrast to Straughan and Roberts' (1999) argument that younger people behave in a more environmentally friendly way than older ones. It is also the opposite of Patchen's (2006) assertion that older persons tend to be more concerned about environmental problems and are more likely to engage in environmental action than youngsters.

Some of this study statistical tests seem to confirm theories from earlier environmental management studies which supported the assertion that environmental awareness evolves in relation to people's ageing process. For

instance, it was argued that younger generations are often more environmentally concerned with environmental issues than the elders. Indeed, the belief was that older generations were engaging in material and social resources accumulation and, in the process, were adopting conservative actions aiming at maintaining their status quo (Dunlap and Van Lier, 1980; Van Liere and Dunlap, 1981; Mohai and Twight, 1987). Moreover, it appears that post 1990s' studies advocate for a 'reverse process' under which older generations are more environmentally aware than younger generations (see Roberts, 1996; Patchen, 2006). These mixed findings do not establish a clear pattern regarding people's age and their environmental awareness as claimed by Aminrad *et al.* (2011) in their study of Iranian students' environmental awareness and attitude. This study's findings are in line with Lizuka's (2000) assertion that even though a relationship between the age of people and their environmental concerns is suggested by many scholars, discrepancies still exist. As such, the inconsistencies in this study's survey does not provide enough evidence to reject their findings either. In summary, this study rejects the assertion that age has a positive influence on environmental behaviours. However, results from age-based investigations for environmental knowledge and environmental perception are still far from conclusive and seem to warrant further research.

6.2.4 Parental Status and Environmental Awareness

This study attempts to discover whether adults with children are more environmentally aware and display better environmental behaviours than those without children. About 19.4% of the respondents had one or more children. The analysis of data shows that parental status has very little effect

on environmental awareness. The findings of this study in relation to the influence of parental status on environmental awareness can be summarized as follows:

(1) Environmental knowledge. Statistical test results reveal a *p*-value greater than the alpha level ($p>\alpha$); and consequently, it is not possible to confirm the influence of parental status on environmental knowledge. This finding supports Coyle (2005) view that parental status has little influence on people's environmental knowledge. It also confirms Akomolafe's (2011) view that people's parental status is not an important factor regarding their environmental knowledge. Nevertheless, the result opposes findings from the OECD (2008), OSCE (2009), and Learned (2011) who all assert that parents are more environmentally knowledgeable and act in a more environmental responsive behaviours than non-parents.

(2) Environmental perception. The results show that parental status plays a role in (a) people cost-effectiveness perception with regard to their environmental management (*p*-value was equal to α (0.05)); (b) their perception of the importance of environmental management for their organisation (*p*-value equal to $0.00<\alpha$); (c) their view with regard to the importance of environmental education event(s) at their workplace (*p*-value equal to $0.017<\alpha$); and (d) their perception of the need for their organisation to do more for the environment (*p*-value equal to 0.000). These findings show that there is a significant difference between respondents with children and respondents without. However, such

differences exist solely for questions relating to their workplace environmental facilities and are inexistent for 'perception' at personal level. These findings confirm at least in part the OECD's (2008) statement that people with children may be more concerned about environmental issues than those without.

(3) Environmental behaviour. The results show that all associated *p*-values are greater than 0.05. Consequently, it emerges that people's parental status does not influence people environmental action. This supports Coyle (2005) finding that parents do not behave in a more environmentally friendly way than non-parents. Akomolafe (2011) also makes a similar finding in his research on factors influencing environmental knowledge in Nigeria and whose results reveal that the parental status of his respondents did not influence their environmental behaviour. Nonetheless, this result is conflicting with the OECD (2008) and the OSCE (2009) as these organisations assert that parents behave more environmentally friendly than non-parents.

This study results in relation to the influence of parental status on environmental awareness provide sufficient statistical evidence to prove that people's parental status does not affect their environmental awareness. This finding is in line with Coyle's (2005) study conducted in the USA and which measured parent and non-parent environmental knowledge and awareness. Coyle (2005) found that no statistical difference of environmental awareness and knowledge existed between adults with children and adults without. The result also confirms Akomolafe (2011) argument that parental status is not an

important factor in respondents' environmental knowledge, behaviour and awareness. This finding also rejects existing theory on environmental awareness which ascertains that parental status plays a role in people's environmental awareness and behaviour. Indeed, a number of academics have made a postulation on the theory of altruism (see Allen and Ferrand, 1999; Piliavin and Charng, 1990; Khalil, 2001, 2004). Altruism advocates argue that people become more environmentally altruistic when they become conscious of other people's potential suffering due to their (or their society) environmental action. In other words, it creates in such individual a sense of responsibility regarding the alleviation of other people potential misery due to environmental degradation (Stern *et al.*, 1993; Allen and Ferrand, 1999; Kollmus and Agyeman, 2010). Hence, it is believed that parents may be more concerned about environmental issues than those without in part because of their fear of exposing their children to potential (and future) suffering (Coyle, 2005; OECD, 2008; Learned, 2011). Conversely it is worth noting that there is an inconsistency in this finding. Indeed, the results suggest that parental status influences people's perception of environmental issues but generally, these results fail to support the claim that parental status influences people's environmentally awareness and behaviour.

6.2.5 Education Level and Environmental Awareness

This study attempts to find possible influence of the education level of respondents on their environmental awareness and behaviour. The results show that:

(1) Respondents' education level influences their environmental knowledge only when (a) comparing respondents with a high school against those with a college degree (*t*-value =0.03); and (b) comparing respondents with a high school to those with a Masters degree (*t*-value=0.012). However, comparison between groups with different levels of university degree reveals no statistical evidence. The result for this could be that schools and colleges do not teach environmental education programmes (Ajiboye and Silo, 2008). Thus, the respondents who have good environmental knowledge could be due to respondents' level of interest in the issue and have nothing to do with their educational level (Baruah *et al.*, 2011). This finding confirms Kollmuss and Agyeman's (2002) assertion that people's education level influences their environmental action.

(2) Respondents' age plays a role in their ability to (a) perceive the cost-effectiveness in terms of financial benefit for their organizations adopting pro-active environmental management policies (p=0.001<α); and (b) to perceive the necessity for their organisations to do more regarding environmental management (Binomal tests reveal a *p*-value of 0.000 <α). This result confirms Hager *et al.* (2007) findings that seniors had higher level of environmental concern and perception than the young ones. An explanation of this result could be that older respondents are more exposed to environmental information via the numerous media channels (internet with platforms such as facebook, twitter, the television, etc).

(3) The results show that there is an association between the respondents' environmental behaviour at personal level and their education level. This confirms Kollmuss and Agyeman's (2002) assertion that people's education level influences their environmental action as well as Patchen (2006) assertion that better educated people in USA and Europe are more likely to engage in pro-active environmental actions than those with lesser education. It also supports Baruah *et al.* (2011) finding that people's education level influences their environmental behaviour. Moreover, this result rejects Soonthonsmai's (2001) argument that an environmental action is not influenced by people's education. Furthermore, the results show that there is no association between the respondent's environmental behaviour at workplace level and their education level. Indeed, no statistical evidence exists from this study to conclude that education level influences environmental behaviour at work.

These results show that a significant correlation exists between people's education and their environmental awareness and behaviour. This finding is in line with findings from Castelli (2004), Duroy (2006), Patchen (2006), Asmar (2009), Boland and Heintzman (2009), Chen *et al.* (2010) and Baruah *et al.* (2011) who all argue that education level plays a role in an individual's environmental awareness and behaviour. Moreover, these results confirm Duroy's (2006) finding that individuals' education level affects their environmental awareness and behaviour (Duroy, 2006). The influence of education on environmental awareness and behaviour is likely to be due to modern mass media exposition and possibly, as Aminrad *et al.* (2011)

suggest, to people likelihood to accept and trust non-governmental organisations which are very active in environmental causes. For example, many students are known to be active NGO's members (see Yang, 2005; Zhang, 2009). This finding is however contrary to that of Akomolafe (2011) that the education level did not influence environmental awareness and behaviour in Nigeria.

6.2.6 Profession and Environmental Awareness

The outcome of the investigation regarding respondents' profession/earnings link with their environmental awareness is interesting. Indeed, the results show that (1) environmental knowledge is not influenced by a person's job (or his/her earning) as statistical tests show *p*-value >α. This finding contrasts with Van Liere and Dunlap's (1981) assertion that there is a positive correlation between environmental knowledge and people social class (precisely income). Another finding is that (2) environmental perception is correlated with an individual's profession (*p*-values greater than α). It is also found that (3) environmental behaviour is not conditioned by an individual's job profession (all *p*-values are greater than α).

These results show that there is no association between people's profession and their environmental awareness and behaviour. Soonthonsmai (2001) asserts that an environmental action is influenced by an individual's profession (thus income). Moreover, Henion (1972) states that those with higher earnings are more likely to act in an ecological friendly way than those with lower incomes. With that in mind, this research which is carried in Great Britain (a developed country) should reveal strong evidence of environmental action for

those on higher earnings. However, this study does not support Henion's (1972) nor does it confirm Soonthonsmai's (2001) assertion. Indeed, there is a strong statistical evidence to claim that a person earnings (or profession) do not affect his/her environmental awareness and behaviour. This finding is in line with Duroy (2006: 20) whose results reveal that "economic affluence has, at best, a marginal influence on environmental awareness and no direct impact on environmental behaviour" and with Patchen (2006) who expresses his doubts regarding possible association between people's profession and their environmental awareness and behaviour. This finding is also in line with Kleftoyanni *et al.* (2010) research in Greece which found that individual's occupation does not influence their perception of environmental impacts nor their environmental awareness.

Furthermore, this study attempted to test for a possible correlation between people's social status and their environmental awareness. In testing for such a correlation, it is believed that the following characteristics: parental status, education level and people's profession - are components of people's social status (Lizuka, 2000). This study have established that (i) a correlation exist between people education and environmental awareness and behaviour; (ii) no association exist between people's earnings and their environmental awareness and behaviour; (iii) an association exist between parental status and people's perception of environmental issues; and (iv) no correlation between parental status and environmentally awareness and behaviour. These findings provided inconsistent results for asserting that an association exist between people's social status and their environmental awareness. This is because many elements can define people's social status (i.e wealth,

power, education, health, race) (Rummel, 1976; Perry and Francis, 2010) and depending on the ones studied, such association can be confirmed (i.e. education) or rejected (i.e. people's income).

To conclude this section, this study contradicts many researchers' findings (e.g. Van Liere and Dunlap, 1981; Duroy, 2006; Patchen, 2006; Laroche *et al.*, 2001 etc.) and confirms others (e.g. Roberts, 1996; Lizuka, 2000; Coyle, 2005; Patchen, 2006; OECD, 2008). An implication could be that the sampled respondents do not possess all the necessary elements to be environmentally aware which will positively contribute to the objective of achieving sustainable management. Their lack of environmental awareness could be due to the fact that environmental concepts and management is not taught at schools, colleges or universities. It is thus not a wonder if respondents did not achieve high level of environmental knowledge. Another implication could be that respondents lack of environmental awareness can be due to the fact that this study is based in a developed nation where the 'geographic location' (Patchen, 2006) means they are less exposed to environmental degradation and to health risks as a result of pollution as their counterparts living in poorer or developing countries and who tend to achieve high levels of environmental awareness (Brechin and Kempton 1994, Martinez-Alier 1995, Dunlap and Mertig 1995; Shabina, 1999; Shobeiri *et al.*, 2006, Aminrad *et al.*, 2011).

6.3 ENVIRONMENTAL LITERACY AND ENVIRONMENTAL ACTIONS

In investigating if a correlation existed between a high level of environmental literacy and environmental behaviour, this study carried out statistical tests at individual level and at workplace level.

6.3.1 Environmental Actions at Personal Level and at Workplace Level

This research statistical analysis reveals *p*-values of 0.177 (for environmental action at personal level) and 0.092 (for environmental action at workplace level). Both *p*-values are higher than 0.05. Plus the magnitude of the difference in the mean (mean difference=0.327; CI:-0.151 to 0.806) is large (eta squared=0.99). That means it is statistically impossible to confirm a correlation between this study respondents' environmental knowledge and their environmental behaviour. This finding matches Hwang *et al.* (2000) assertion that higher environmental knowledge does not guarantee pro-active environmental behaviour. However, it rejects Akomolafe's (2011) finding which establishes a relationship between environmental knowledge and people's environmental behaviour. It also rejects assertions by many other authors that a correlation exists between knowledge of environmental problems and environmental behaviour (see Amyx *et al.*, 1994; Chan, 1999; Stern, 2000; Tilikidou, 2001; Tan, 2011).

6.3.2 Discussion of the Environmental Action Findings

This study has been conducted in a country which is at the forefront of the fight against global warming at international level (DEFRA, 2011; UN, 2012). It could have therefore been expected to find some correlation, although infinite between environmental literacy and environmental behaviour. This study inconclusive finding could be due various reasons listed below:

(1) Personal factors

This study findings can be due to the fact that people only act to preserve the environment if: (a) they can perceive their actions as bringing net benefit to themselves, the humanity and the environment; and if (b) they can get more emotionally aroused regarding the dangers of environmental treats (Patchen, 2006: 5). Thus it could be argued that the studied respondents are not seeing what benefits they can gain for adopting environmental practices, and they do not clearly perceive the dangers of lack of environmental management. Besides, it is clear from the preceding findings that social influences can play a determinant role in individuals' environmental actions (Patchen, 2006). For example, an individual residing in a city which does provide convenient recycling facilities and whose neighbours endorse 100% such program is more likely to adopt recycling behaviour than another person who regards recycling as being inopportune and whose neighbours disregard the program. This could explain the finding given that 40.9% of the respondents in this research believe recycling is not part of their country culture.

(2) Institutional factors

Another explanation could be found in the lack of institutional factors which are known as playing a key role in environmental actions (Kollmus and Agyeman, 2010). Indeed, Kollmus and Agyeman (2010) argue that pro-active environmental action is only possible if three essential elements are met. Firstly, institutional factors such as the necessary infrastructures are available (e.g. recycling, public transportation) - for instance, cities in the European Union which do not provide recycling facilities are those were citizen recycle the less (OECD, 2008). Secondly, social and cultural factors are in phase – indeed, it was observed under the preceding section that some social elements influence environmental behaviour. Moreover, Kollmus and Agyeman (2010) argue that culture in smaller and densely populated countries like the Netherland and Switzerland makes them more resource conscientious than citizen of large and resource-rich nations. Thirdly, economic factors are considered - in the sense that an individual's environmental behaviour is influenced by economic incentives. An example can be Kollmus and Agyeman's (2010) point that until recently, low heating oil and car fuel prices America prevented people from adopting energy conservation measures but thing is slowing changing now that prices are increasing. Another example can be Germany policy which requires people to leave a deposit for bottled beverages which is only refunded when empty bottles are returned - is believed to explain the high level of bottle recycling in the country.

(3) Environmental barriers

The existence of environmental barriers could also explain the lack of a correlation between environmental knowledge and environmental behaviour.

Blake (1999), for instance, asserts that there are three environmental barriers which can limit environmental actions even for environmentally knowledgeable people. Blake (1999) identifies the following: (i) individuality, which he argues is strong in people who do not have strong environmental concern (and their potential environmental concerns tend to be outweighed by other conflicting attitudes). Issues such as the fact that old habits and routine are hard to change can play a determinant role in an individual's environmental inaction (Stern (2000). Indeed, Patchen (2006) stresses that an individual's environmental action is affected directly by his/her habit. The general idea is that past behaviour is the best predictor of future environmental behaviour (Ajzen, 1991; Bamberg *et al.*, 2003; Graybiel, 2005; Patchen, 2006). Furthermore, this point fits in well with the theory of 'altruism' presented earlier (see Stern *et al.*, 1993; Allen and Ferrand, 1999; Kollmus and Agyeman, 2010). Blake (1999) also identifies (ii) responsibility and priorities which he states most individuals who do not embark on pro-environmental action believe they have no power for influencing the situation, and/or they do not have to take the responsibility for it. For instance, for most people, the most important thing is their own well-being and the well being of their family (Stern *et al.*, 1993; Stern, 2000). If pro-active environmental behaviour is fitting with their personal priorities, the motivation to adopt environmental behaviour increases (i.e. buying organic food). However, if it contradicts their priorities, then they are more likely not to adopt pro-active environmental actions (e.g. getting the whole family to use public transports than using their personal cars). Blake's (1999) third environmental barrier is (iii) practicality, which he points are the social and institutional constraints preventing many individuals from undertaking pro-active environmental actions (e.g. lack of time, lack of

money, and lack of information). For example, even if an individual knows that he/she can make a significant saving and avoid stress by using public transport to go to work, if it is practical, that person might choose to repeat this behaviour and keep driving his/her car if he/she is used to driving to work.

To end this section, this study does not confirm assertion that a correlation exists between environmental knowledge and environmental behaviour. An explanation could be that although the respondents might be environmentally knowledgeable, they need to see the benefits they can gain from adopting environmental practices before engaging into environmental management. Their lack of environmental behaviour could be due to the lack of institutional factors such as the necessary environmental infrastructures, or even due to Blake's (1999) environmental barriers. The following part focuses on organisational environmental awareness.

6.4 ORGANISATIONAL ENVIRONMENTAL AWARENESS

The previous section discusses the individual environmental awareness at the personal level and workplace level. This section focuses on organisational environmental awareness. It will discuss organisations' environmental policies, organisations' environmental facilities and activities, and organisations' environmental reputation.

6.4.1 Environmental Policies

This study found that organisations' management is the main reason why organisations adopt pro-active environmental policies. It is followed by 'the legislation' which the respondents regard as the second most influential factor motivating the adoption of environmental policy. To the best of the researcher knowledge, most organisations environmental management literature agrees on the fact that:

(i) one of organisations' first goal in adopting environmental policies is compliance with government regulations (Hutchinson, 1992; Forsyth, 1997; Andrews *et al.*, 1999; Reinhardt, 2000; Altman, 2001; Pulver, 2001; Jenkins *et al.*, 2002; Freeman and Farber, 2005; Potoski and Prakash, 2004; Crew and Heyes, 2005; Gurtoo and Antony, 2007; Hasnas, 2009; Lange and Gouldson, 2010);

(ii) Organisations' managers can achieve sustainable development if they take responsibility for the environmental impact of their organisations' activities (Robert, 1997; Robinson, 2000; Zutshi and Sohal, 2004; Gadenne *et al.*, 2009).

These findings confirm Banerjee's (1998) and Gadenne *et al.*'s (2009) assertion that legislation is the reason why organisations will engage in environmental actions. This finding, which is in line with most of others studies.The results show 'managers' as the most determinant factors for the adoption of environmental policies by the studied organisations. This finding can help explain the lack of environmental activities and facilities by the studied organisations (presented in the following paragraphs). Therefore,

non-environmentally aware management might not see the importance of the required environmental changes within their workplaces, and they might just regard such policies as extra cost for their organisation (DiMaggio and Powell, 1983; Delmas and Toffel, 2003; Gadenne *et al.*, 2009; El Dief and Font, 2010; Laughland and Bansal, 2011). Managers' perceptions of environmental issues are determinant for the adoption of environmental policies (López-Gamero *et al.*, 2011). If the sole purpose of management engaging in sustainability is 'to comply with the law', it could explain why most of the studied organisations had an EMS protocol; and why environmental facilities and real environmental activities were lacking.

It is generally accepted that managers' main objective is to ensure their organisation satisfies their stakeholders and sells to their consumers. Past debates have move environmental awareness and organisations environmental policies to the perspective of consumers' environmental awareness. Indeed, it is generally believed that socially responsible consumers are willing to do more for the environment including paying more for environmentally friendly products (Banerjee and McKeage, 1994; Laroche *et al.*, 2001) and it is largely accepted that their number is growing (Banerjee and McKeage, 1994). Therefore, it could be argued that presenting environmental policies toward the 'consumer environmental awareness and environmental satisfaction' could help improve organisations' environmental policies (Gerrit *et al.*, 1998; Laroche *et al.*, 2001; Daskin, 2004; Chiou *et al.*, 2011). This argument is supported by Laughland and Bansal (2011) who found ten reasons for the non-adoption of environmental policy by organisation and which includes the fact that 'consumers do not consistently

factor sustainability into their purchase decision'. Therefore, if consumers are environmentally aware, it will exercise a vast influence on organisation environmental policies (Delmas and Toffel, 2003; Baumast, 2001).

This research also found that none of the respondents is willing to stop working for their organisation. It also appears that not many of the respondents have tried or are trying to improve their organisations' lack of environmental actions. Moreover, the respondents are aware of the fact that their workplaces are not adopting clear environmental policies. Indeed, 55% of the respondents believe their organisations should do more regarding their environmental policies given that their organisations: (i) lack environmental facilities and activities (for example, only 48.4% of organisations encourage at least one recycling activity, merely 34.4% encouraging at least energy saving, and 59% not having double glazed windows); (ii) have a high volume of waste generation which is a concern for the respondents; and (iii) actions are environmentally unfriendly. This finding opposes a wide spread view in environmental literature which claims that people would refuse to work for non-environmentally friendly organisations (see Wagner and Llerena 2008; St. Clair, 2011). In fact, it was revealed (see chapter 3) in a UK survey by the Industry Society on organisations' employees' concerns that 82% of UK employees would refuse to work for organisations whose values they do not share (see Willard, 2005). A reason for this result could be the difficult economic situation prevailing in Europe and in other continents at the moment. Eurostat (2012) estimates that 25.913 million men and women were unemployed as of October 2012 in the 27 European countries. Therefore, many respondents who are not agreeing with their organisations'

environmental policies might decide to carry on working for them because it is harder to find employment somewhere else. This is especially true in European countries where unemployment rates are extremely high especially among the younger generation (e.g. Greece and Spain have unemployment rate of over 50%). Further evidence which could support this view is another Eurostat (2012) statistics which shows that 22% of the 15-24 year-olds in the EU is unemployed.

6.4.2 Environmental Facilities and Activities

This study found sufficient evidence to conclude that environmental facilities available at work and environmental activities conducted at workplaces for the enhancement of environmental awareness of employees are limited. This finding is puzzling for the researcher. Indeed, the UK government is taking a major lead in tackling environmental problems (see UK department of trade and industry, 2005; DEFRA, 2008, 2012). One will expect UK organizations to have adopted or to follow their government lead on the issue. However, this finding proves the contrary which somehow confirms growing concerns from Green Peace (2008) and Harrabin (2011) regarding environmental problems in the UK. Although the evidence suggests that adopting pro-active environmental actions is not a financial burden and that customers, employees and investors are usually happier to commit (Hutchinson, 1992; Porter and Van der Linde, 1995; Orlitzky *et al.*, 2003; Grant and Sonnentag, 2010; Ernst & Young, 2011), the studied organisations lack in environmental facilities (e.g. lack of water control systems, lack of double glazed windows). An explanation could be that environmental management is still not fitting neatly into organisations' business cases as found by Laughlan and Bansal

(2011) in their Canadian investigation on why Canadian organisations don't take action on environmental issues. Indeed, it is believed that a considerable number of managers are still not able to view sustainability investment as rewarding (Laughlan and Bansal, 2011). Thus it could explain why environmental facilities are lacking. Furthermore, the lack of environmental facilities could be due to the lack of clear and simple guidelines which could positively engage organisations' stakeholders. Indeed, organisations need to understand and accept governments' views on sustainable development; plus governments must create a situation of mutual respect and trust as well as encourage organisations to adopt and/or to research for new greener approaches to sustainability.

This results which measure environmental activities within organisations, show a p value $>\alpha$, and a correlation coefficient $r_s = 0.37$. This finding matches Zilahy and Milton's (2009) result of their investigation on organisations' environment activities in Hungary and who found that the studied organisations' environmental activities lag behind. Bohdanowicz (2006) also made a similar finding in her study of Polish organisations. A surprising fact with this result is that many of the studied organisation claim to have adopted EMS systems and some do possess ISO standards certificates. Reviewing the requirements for EMS and ISO certifications, it is noticeable that environmental activity is a requirement (Morrow and Rondinelli, 2002; Goldstein, 2002; IEEM, 2007; Valentine and Savage, 2010). Therefore it can be argued that many of the studied organisations are not engaging in what Pulver (2001: 2) calls "corporate green washing" of their environmental destructive practices, or what Potoski and Prakash (2004) refer to as "a

regulatory relief" given that EMS certificates give organisations' self governance regarding environmental management. This finding raises alarm because previous studies have linked 'environmental facilities' to environmental awareness and behaviour (Hutchinson, 1992; Bhargava and Welford, 1996; Byrch, 2009). Moreover, previous researches have concluded that organisations share an enormous responsibility with regard to environmental pollution (See Craig, 1996; Stern, 2000; Hassan *et al.*, 2002; Kwong, 2005). Thus, one will expect organisations to develop 'altruism' attitude regarding environmental management and policies. However it is not the case (see Stern *et al.*, 1993; Allen and Ferrand, 1999; Kollmus and Agyeman, 2010). A reason for such a lack of activity could be the non-prominence, the lack of regular controls or checks of the awarded organisations by the institutions delivering environmental certification (Bohdanowicz, 2006). Bohdanowicz (2006) reports for example that in Sweden, respondents of a research she conducted said that they had been familiar with Swedish environmental institutions because of active and regular interaction and check by environmental officers from the Swedish authorities. Also, Bohdanowicz (2006) notes that resident environmental officers were commonly found in the Swedish organisations she studied. Therefore, it could be argued that the lack of environmental activities at many of the studied organisations is due to the level of EA at management level.

6.4.3 Environmental Reputation

All Chi-square for independence and Spearman's rank Order correlation tests carried in this study to establish whether sustainable organisations were having a good reputation among their staffs revealed p-values superior to 0.05

($p>\alpha$). This finding is surprising but it is understandable if related to the fact that the organisations studied focus on media to promote their environmental actions. Moreover, the findings show that only a few fractions of the studied organisations (5.58%) relied on their employees for environmental policy promotion. Indeed, the use of media to 'raise the knowledge' of people regarding their environmental actions has real limitations (Coyle's, 2005). Also, the media choice could help promote biased information as it could allow organisations to hand-pick the 'good news' while ignoring the 'bad news' (Gray and Milne, 2002). Coyle (2005:19) points out that media are a powerful form of ecological information, and they only help accentuate one of the main problems of environmental education, which is the environmental myth (Sanera, 2008).

These findings are in line with Carrascosa-López *et al.* (2012) who state that people would like to work for environmentally friendly organisations. However, the findings are puzzling because it was found earlier that sustainable organisations do not have a better reputation and image among their employees. So employees would like to see more environmental friendly policies from their workplace but that alone does not improve the image they have of their workplace. It is safe to assume other factors such as wages, type of contract, work environment and more must be taken into consideration to understand organisations' image among their employees.

To end this section, environmental awareness of the organisations studied can be summarized in the following points: (i) managers are the most determinant factors for organisations' adoption of environmental policies, (ii)

there is a lack of environmental facilities; (iii) there is a lack of environmental activities; (iv) no correlation exists between organisations' environmental facilities and activities and their employees' environmental awareness; (v) sustainable organisations do not have a better reputation among their employees; (vi) most organisations rely on media to promote their environmental policies.

6.5 CONCLUSION

Based on the preceding discussions of the findings, it emerges that achieving environmental awareness at individual level and at organisational level requires the elements presented in Figure 6.1. It can be concluded that Figure 6.1, which is based on the previously proposed environmental development process in Chapter 3 (see Figures 3.5 and 3.6), represents a more accurate model of environmental awareness and behaviour development process. This model presents this study's contribution to knowledge. It is proposed in Figure 6.1 that:

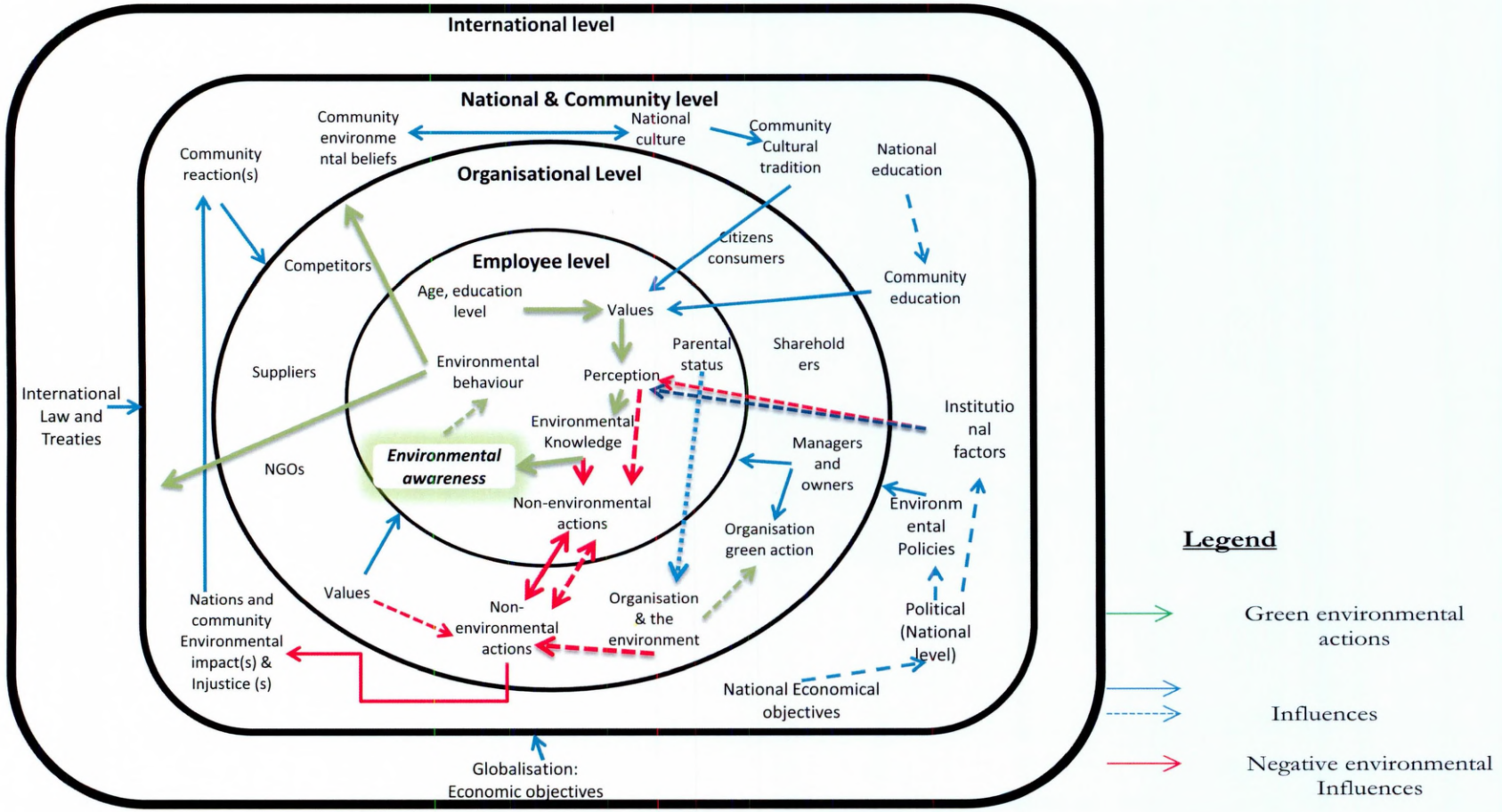
(i) Elements such as national factors which are influenced by international development (e.g. institutional factors, national culture) and community factors (e.g. communities' culture and education, communities' traditions and beliefs) are determinants of an individual's values and perception of environmental management. Moreover, factors such as national policies and communities have an impact on organisations' environmental awareness (as also presented under Figure 3.5 in chapter 3).

(ii) Environmental awareness at individual level is shaped by individuals' education level. Moreover, it is also claimed that other socio-demographic factors have a marginal or direct influence on certain elements of environmental awareness such as (i) parental status which influence individuals' perception of their workplace environmental actions; and (ii) individuals' age which has a correlation with their environmental knowledge and perception. Moreover, Figure 6.1 also proposed that institutional factors can repel people from undertaking pro-active environmental actions it also shows that environmental perception can lead to pro-active or negative environmental actions. Beside, environmental awareness can lead to environmental action. When environmental behaviour is achieved, it impacts at the workplace level and at the community level.

(iii) Environmental awareness at organisational level is determined by managers' environmental awareness. Therefore, a lack of managers' environmental awareness could explain lack of organisations' environmental policies such as lack of environmental facilities and lack of environmental activities. Moreover, it is accepted that organisations' environmental facilities and activities have no correlation with employees' environmental awareness nor that organisations environmental awareness is directly correlated to their reputation among their employees.

The next chapter summarises the main findings of this study. It also recommends actions for practitioners and pinpoints possible areas for future research.

Figure 6. 1 Environmental Awareness and Behaviour Development Framework



CHAPTER SEVEN

CONCLUSIONS AND RECOMMENDATIONS

7.1 INTRODUCTION

The chapter provides this study's conclusions as well as it makes recommendations based on the findings and the discussions of the previous chapters. The chapter starts with a summary and conclusion of the study. This study's aim and objectives are revisited in section 7.3. This research's Hypotheses are also listed under this section as well as the outcome of the statistical testing of the Hypotheses. Section 7.4 looks at this study's contributions to knowledge which are presented under two aspects: contribution at the theoretical and at a practical level. Moreover, recommendations for practice are made under section 7.5 and included recommendations for governments and organisations. In section 7.6, the limitations of this research are examined and suggestions for further research are made under section 7.7. Section 7.8 presents the conclusion of this study.

7.2 SUMMARY AND CONCLUSIONS OF THE STUDY

This study has addressed the issue of environmental degradation and presented an analysis of environmental awareness in organisations as an effective solution in the fight for sustainability. The study aimed at contributing to knowledge in the field of social sciences (especially the field of organisation management and environmental management cohesion). It also intended to address and inform on the issue of environmental degradation (and potentially educate on the issue of environmental awareness). The main objectives of the study were: (i) to investigate socio-demographic characteristics' correlation to environmental awareness and behaviour; (ii) to uncover factors influencing organisations' environmental decisions as well as investigating organisations' environmental awareness and actions; (iii) to evaluate organisations' environmental efforts and to determine if organisations' environmental policy influences their employees' environmental awareness; (iv) to identify methods of promoting environmental awareness at individual and organisational levels; and (v) to make recommendations for the improvement of environmental awareness and behaviour.

Overall, 300 digitalized questionnaire links were sent by email to the sampled population, out of which ninety three (93) usable questionnaires were returned (the survey response rate was 31%). Statistical techniques (factor analysis) were used during the questionnaire elaboration to test its reliability and validity. Yamane's formula was used to determine the minimum acceptable responses for this study survey and no statistical techniques were used during the data collection. In terms of hypotheses testing, statistical and analytical

techniques such as the Chi-square test, the Spearman's rank order correlation, the *t*-Test for statistic significance, the Binomal Regression and the Statistical Confidence interval were used where appropriate to either confirm or reject hypotheses. The analysis was organised under three main perspectives: (a) socio-demographic influences on environmental awareness; (b) environmental education and pro-active environmental actions; and (c) organisations' environmental management and their reputation among their employees.

The overall conclusions drawn from the results of the study are as follows:

(1) There is no gender, no age, no earnings (employment), and no parental status influence on environmental awareness. However, a correlation exists between the respondents' education level and their environmental awareness and behaviour. Also; (i) a correlation has been established between people' parental status and their perception of their organisations' environmental actions; and (ii) a significant difference has been found between people aged 35 or under and those aged over 35 years old regarding their environmental knowledge as well as their perception of environmental issues.

(2) This study does not find conclusive evidence to confirm the existence of an association between people' environmental education and their environmental behaviour. The evidence suggests that such correlation does not exist because of a variety of factors such as: (a) personal factors (i.e. the evidence shows that this study's respondents are not seeing what benefits they can gain from adopting environmental practices, and they do not perceive the dangers of a lack of environmental management); (b) institutional factors (i.e.

the lack of institutional factors which are known as playing a key role in environmental actions such as recycling facilities, public transportation, social and cultural factors); and (c) environmental barriers (i.e. individuality is strong in people who do not have strong environmental concern, old environmental habits and routine).

(3) With regards to organisations' environmental management, this study found that the studied organisations' environmental facilities and activities were insufficient. No correlation was found to exist between a lack of environmental facilities and activities and their employees' lack of environmental awareness. The study also established that the participating organisations relied on the media supports for the promotion of their environmental policies. Managerial decisions were found to be the predominant reason why the studied organisations would adopt sustainable environmental policies. Furthermore, the majority of the respondents had negative opinions of their organisations' environmental actions.

7.3 REVISITING THE RESEARCH AIM AND OBJECTIVES

The aim of the study was: (i) to contribute to knowledge in the field of social sciences (especially the field of organisation management and environmental management cohesion); (ii) to address the issue of environmental degradation; and (iii) to inform and if possible educate on the issue of environmental awareness. In order to achieve the research's aim, the following objectives were drawn:

Objective 1: To demonstrate that people's environmental awareness and behaviour differ according to their socio-demographic characteristics (i.e. gender, age, parental status, education level and income). The following hypotheses were developed to achieve the objective:

- *$H_2$2: there is a correlation between environmentally aware and people's social status* – which was neither rejected nor accepted as depending on specific social characteristics, the hypothesis could be accepted or rejected
- *$H_3$3: There is a correlation between socio-demographic variables (gender, age, profession, parental status, education level) and environmental awareness* – which is rejected because the statistical tests did not provide evidence to confirm the Hypothesis.

Objective 2: To investigate organizations' environmental awareness and action(s) as well as factors influencing organisations' environmental decisions (including potential difficulties). The following hypotheses were developed to achieve the objective:

- *$H_3$1: Complying with environmental regulation is the main reason why organisations implement environmental requirements* – The Hypothesis was rejected as the results show that 'managers' was the most determinant factors for the adoption of environmental policies by the studied organisations
- *$H_3$2: Organisations' employees are environmentally aware* – which was rejected based on the statistical results

- *H_36: Environmental facilities available at work and environmental activities conducted at workplaces for the enhancement of environmental awareness of employees are sufficient* – The Hypothesis was rejected as the results show a lack of environmental facilities and activities

Objective 3: To evaluate organisations' environmental efforts and to determine if organisations environmental policy has an influence on employees' environmental knowledge and behaviour. The following hypotheses were developed to achieve this objective:

- *H_34: Organisations use their employees to promote sustainability among staff* – which was rejected as the results show that organisations rely on media for promoting sustainability
- *H_37: There is a correlation between environmental facilities and activities available at organisations' workplace and their employees' environmental awareness* – which was rejected as the statistical tests results did not provide evidence to support the Hypothesis.

Objective 4: To identify ways to improve and promote environmental awareness, which could be applied worldwide. The following hypotheses were drawn:

- *H_21: An individual with good Environmental Knowledge will take pro-active Environmental Actions* – which is not confirmed as *t*-tests were inconclusive

- *$H_3$5: Sustainable organisations have a better reputation and image among their employees* – which was rejected as the test results did not support the Hypothesis

Objective 5: To make recommendations for the improvement of environmental awareness and behaviour: environmental management.

This research also took steps to better understand the relationship between people's socio-demographic characteristics and environmental motivation, and their commitment toward environmental management as well as respondents' views of their workplaces' environmental management. Results from this study indicate that awareness toward environmental issues is dependent on the following factors being evident:

- People to have a good environmental knowledge and being able to see the 'personal benefit' of their adoption of green practices.
- The availability of recycling facilities.
- Their organisations having good environmental policies, facilities and activities.
- Organisations' management committing to sustainable development.

7.4 CONTRIBUTION TO KNOWLEDGE

This study has contributed to knowledge at two levels which are interrelated: theoretical and practical, as explained below:

7.4.1 Theoretical level

Extensive review of the literature was carried out in this research in order to (i) find how useful the literature was in relation to the research aim and objectives; and (ii) identify any gap in the available literature which would enable this research to make a contribution. Therefore, it can be concluded that this research's findings have added to the literature in three main areas. These are the three main theoretical contributions:

1. To the best of the author's knowledge, this research is the first to assess people's environmental awareness and behaviour at an individual and organisational level as well as employees' perception of their organisations' environmental policies. This study is a new one in the field of environmental management and the novelty is a contribution to knowledge in itself.

2. The study proposes two theoretical models regarding (i) factors affecting environmental awareness (Figure 3.8 in chapter 3); and (ii) environmental awareness development process (Figure 6.1 in chapter 6). The Figures were developed as a working model to help practitioners as well as academics to grasp the development process of environmental awareness and behaviour. This can be used in practice and in further studies.

3. This research's findings support the following concepts: (i) employees are not environmentally aware; (ii) environmental knowledge and behaviour is to a certain extent a function of people' education, age and

gender; and people's environmental commitment and motivation should be supported by encouraging environmental activities and by making sure environmental facilities are available at organisations' workplace and within local communities.

7.4.2 Practical level

This study makes the following contributions:

1. Figures 3.8 and 6.1 show that there is an interlinking and interdependent association of aspects regarding individuals' environmental awareness and behaviour. Moreover, an awareness of this interdependence of factors can assist policy and decision makers to implement change and increase environmental awareness (thus governments for example can better manage environmental objectives within their society and at an organisational level). Plus, such interdependence can also assist organisations' managers to better administer environmental change within their organisations.

2. At an individual level, this study enables people to realise how uninformed they are regarding environmental problems. It also gives people sufficient knowledge to improve their environmental education and awareness, as well as motivation for engaging more into pro-environmental initiatives.

3. Implementing this research's findings will enable organisations to fully engage in the sustainability 'fight' as well as making sure their employees play a key role in achieving their sustainability objective(s).

It is therefore the researcher's belief that this study offers practical guidance and orientation to all environmental 'actors' (policy makers, organisations' leaders, individuals) whenever they deal with environmental awareness and behaviour issues and more generally environmental management.The researcher also believes that this study has added to the existing literature and has contributed to environmental management literature in general. This study could serve as a reference for understanding why employees are not fully embracing environmental management and it paves the way for understanding organisations' as well as employees' environmental actions.

7.5 RECOMMENDATIONS FOR PRACTICE

The results of this study and its interpretations contain some important and practical implications for governments and organisations as presented below.

7.5.1 Recommendations for Governments

Governments across the globe own and control most of - if not all - natural resources (forests, rivers, mines, and more), infrastructures (dams, irrigation systems, power stations, roads, etc) and even industries (for example the nuclear industry in France) (Blackman and Baumol, 2008; UNEP, 2002, 2011) As a result, governments also share great responsibilities with regard to

environmental degradation and are key players in environmental preservation objectives. It is ever more noticeable that governments are increasingly considering the awareness of their citizens (and organisations) with regard to environmental management as a priority, at least in developed nations (see EPA, 2002; DEFRA, 2008, 2011). In order to achieve sustainable development, public participation and organisations' participation is essential. Such participation can only be obtained through public and organisation awareness (see chapter 2 and 3). Based on this research finding, the following recommendations are made:

1. Environmental education

This study has found a lack of environmental knowledge among the studied sample in the United Kingdom. Thus, the UK government (and other governments) should adopt a pro-environmental education policy(ies) which requires schools, colleges and universities to teach environmental management. It is believed that including environmental science in school programmes is the most effective way to educate children about environmental issues, and that classroom education will help foster responsible environmental behaviour among youngsters so that when they become adults, they will be environmentally educated and could easily become environmentally aware.

2. Environmental 'caring'

Governments must make 'environmental caring' part of the culture of their countries. Surprisingly, merely 36.6% of respondents regard recycling as part of the culture in Great Britain. This could explain the lack of environmental

action given that most people believe it is not part of their culture. Consequently governments must develop programmes focussed on public participation strategies (as well as getting support from local communities) with the aim of obtaining a behavioural change among citizens. Public participation is paramount because society is also responsible for the planet's environmental degradation, and as a result should show commitment to environmental sustainability.

3. Simplifying environmental management.

Governments should make the environmental management concept easier to understand for their citizens. Indeed, although environmental management is an important and popular concept, it is a perspective that is not easy to define with exactitude. Consequently, it is one that is difficult to measure or to understand by many (UN, 2008). This research's finding also revealed that many respondents were either not environmentally knowledgeable or not engaging enough in an environmentally sustainable way. Hence, another suggestion is for environmental advocates to link environmental concepts/theories to practice so that most people will be able to understand environmental management. People should also be encouraged to think about environmental issues as something broader which is interconnected with their own life rather than just something they see in the media. The idea behind this is that if such steps are taken, people will be able to easily identify concrete steps and actions which they can take toward environmental sustainability.

4. Tougher environmental regulation

Governments should adopt a tougher and stricter stance regarding environmental issues caused by organisations. Self-governance standards such as the EMS (i.e. ISO, EMAS, etc.) are widely-available in developed countries however many organisations lack environmental awareness and actions (although they are members of EMS institutions). For that reason, it is recommended to governments to adopt "command-and-control" environmental actions (Potoski and Prakash, 2004:154) under which deterrence enforcement (full inspection and audits, full punishment for violations) including for EMS institutions will oblige organisations to fully commit to environmental goals.

5. Environmental facilities

Governments should ensure that every possible environmental facilities (e.g. recycling facilities, bins, etc) are widely available locally and nationally for citizens and organisations. Indeed, 45% of this study's respondents stated that they recycle because of the availability of the recycling points. Thus, this can generate beneficial results for the environmental cause.

Ultimately, these actions can drive a society toward greater environmental management practices. If governments make sure individuals and organisations have knowledge of environmental problems, knowledge of how to remediate to such environmental issues; and make sure that they take environmental actions, such public/organisations' engagement will represent a great achievement with regard to environmental sustainability.

7.5.2 Recommendations for Organisations

This study's findings act as an invitation for all organisations to embrace fully the concept of environmental management. It is believed that it is primordial for organisations to understand and accept the truth that organisations' processes do hurt the environment (EPA, 2000, 2002). Indeed, organisations must know their environmental footprint and by doing so, it enables them to develop an effective environmental management program. The achievement of environmental management in organisations requires that organisations' values and cultures fuse with the idea of environmental protection and that all organisations' personnel embrace the concept. Establishing a clear vision as an environmentally sustainable organisation would help achieve sustainability within each organisation. For that reason, the following recommendations are made:

1. Management commitment

Organisations' top management must commit to and support environmental management objectives. Managers must engage into dialogue with stakeholders to identify environmental issues. There must have management accountability with regard to environmental sustainability issues at organisational level. Indeed, consistent findings included in this research show that organisations' environmental commitment starts at the top (i.e. it comes from managers and/or owners). In fact, this study found that 49.1% of females and 40% of males' respondents see managers as the most influential element for the adoption of environmental management practices at their workplace. Therefore, this study recommends that managers take a leading role in

environmental management issues and that they push for their organisation to adopt environmental policies.

2. Simplify environmental policies.

Organisations should ensure that their environmental policies are clear, simple and transparent (with regard to their green performances). Organisations' environmental policy must demonstrate accountability. Their policies must allow environmental performance measuring and progress monitoring. The policies should be designed so that: (i) they give confidence among employees, (ii) pushe employees for positive environmental actions, and (iii) include incentives for people to adopt environmental behaviour (Rondinelli and Vastag, 2000; Patchen, 2006).

3. Effective environmental communication

Effective communication of environmental objectives at internal level must follow the designing of environmental policies. This study found that environmental communication was lacking in the studied organisations and thus should be instituted as part of organisations environmental policies (i.e. only 12% of participants stated to have discussed with their management regarding environmental issues; just 18.3% stated to have influenced their organisation's environmental actions; and merely 12% said that their organisations collected environmental feedback from employees). Also, communication must work both ways. Organisations' environmental communication programmes should enable employees to share their views, or to make recommendations for better environmental practices through, for

instance, suggestion boxes as well as enable organisations' leaders to communicate with employees regarding environmental matters.

4. Environmental recognition and reward system

Organisations should adopt a 'recognition and reward system' which could offer visible recognition to employees' environmental accomplishment and thus motivate other employees to fully embrace the organisation's environmental policies. All organisations 'greening' success stories contained elements of "incentives and rewards that aligned program intents with actions" (Rondinelli and Vastag, 2000; Parl *et al.*, 2008:2). In doing so, organisations must keep in mind that people get engaged in programmes differently (i.e. employees have different personalities). Hence, it is essential that organisations draft and present environmental objectives in such a way that not only employees will see the overall benefits for their organisation (as for example billing cost being reduced), but that they (the employees) will also find in their organisation's communication reasons for caring or for adopting environmental policies (i.e. better air quality). As an example, a cleaner might be motivated to adopt environmental effective actions after finding that reducing the quantity of chemical products will benefit his/her health or that it will make his/her job easier.

5. Fully embracing environmental standards

Organisations must fully embrace concepts such as the environmental standards certification or EMS (e.g. the EMA, the British BS 7750.S, or ISO series of standards). Indeed, EMS as presented in chapter 3 can generate advantages for organisations (e.g. environmental costs reduction, better

management practice within the organisation, better reputation among consumers, and compliance with regulations). However, adoption of such standards for the sole purpose of "corporate green-washing" in order to hide organisations' environmental destructive practices or to get a "a regulatory relief" will demonstrate the lack of environmental ethics of such organisations (Pulver, 2001:2; Goldstein, 2002; Potoski and Prakash, 2004:159). Furthermore, organisations attempting to hide their environmental actions run the risk of exposing themselves to campaigns from non-profit organisations (such as Greenpeace) or to community actions/campaigns which could be destructive for their image (Matthews, 1997; Teegen *et al.*, 2004; Schwartz, 2008).

6. Understand the financial benefit of environmental actions

One of the most recurrent reasons for the non-adoption of environmental standards which organisations give is the argument that it is too costly (Chartered Management Institute, 2011). However, there are effective environmental programmes that are not costly. These include, for instance, reviewing water consumption at workplaces (this can lead to the installation of push taps or hippo/dual flush systems), switching off electrical appliance, encouraging the use of the natural light and natural ventilation, reducing thermostat temperature, recycling plastic, reusing printed paper or recycling it, repairing any leaks and so on. Another recurrent complaint regarding adopting greener practice is the fact that it will increase the organisation's costs including product manufacturing costs. Organisations should understand that customers are now more willing to pay more for green products (Laroche *et al.*, 2001). Indeed, a 2011 research by the GfK Roper Consulting Green

Gauge found that inspite of the increasing economic concerns, their respondents still wanted organisations to go green and they were willing to give credit to organisations doing so (GfK Roper Consulting Green Gauge, 2011). The adoption of effective environmental measures can generate savings (e.g. water bills, electricity bills).

7. Environmental officer

Organisations should have a designated environmental officer in each organisation which will ensure all relevant and up-to-date facilities and trainings are made available to employees. The environmental officer will represent a sort of 'environmental platform' that will provide support to employees and could be involved in selecting a 'green' employee for an environmental award.

To end this part, a final recommendation which applies to governments as well as organisations is made. That is the encouragement of research in the field of environmental management. Research is the starting point of knowledge generation and dissemination (Otsuki and Takahashi, 2011). It is deemed important to adopt a multi-sector research approach under which all parties (governments, universities, organisations, etc) will come together to encourage research in environmental management fields. For instance, governments, universities and organisations can work together to encourage environmental technology innovation, or to keep up-to-date with the latest developments and to share best practice for the achievement of sustainable development.

7.6 LIMITATIONS OF THE STUDY

There is a statistical chance that the findings in Chapter 5 and the discussion in chapter 6 may not apply beyond the selected sample. In other words, the results cannot be generalised but they are relatively representative. A second factor that may call for caution in the interpretation of results is the fact that this study analyses only some aspects of organizations' and people's environmental knowledge and behaviour. Other aspects such as the health of the respondents at the time they were filling the questionnaire are not included in the research methodology although these might play an important role in their decision-making process. Indeed, for example, a sick respondent whose sickness is due to environmental degradation might be more aware about the environment and behave differently as opposed to a healthier respondent. Another example could be an organization which experienced in the past bad press due to its environmental action might be more environmentally aware and acts more environmentally friendly as opposed to if it had never faced environmental pressure before. Also, the data used for this study is obtained from primary and secondary sources. This implies that errors, misunderstanding when filling the questionnaire, omissions from the respondents may be reflected in the figures presented in chapter 5 upon which the conclusions of this research have been drawn. Consequently, the results, interpretations, discussions and conclusions contained in chapters 5, 6 and 7 should be viewed with the above limitations in mind. To summarise, this research's findings exposed a number of noteworthy limitations. These include:

(1) The limited 'generalizability' of the mentioned findings because the research was only conducted in the UK and as such, the results may not apply directly to all European citizens or to all citizens around the world. Another restraint is that this study's sample size is small. The main issue with a small sample is the interpretation of results (particularly when using confidence intervals and p-values which usually require bigger sample size).

(2) The lack of 'generalization' of this research's findings is also due to the fact that this study focuses on employees as a sample. This therefore brings limitation in terms of representativeness of the sample if the researcher wants to expand the finding to other categories of citizens.

(3) The overall limited time and the financial resources available which meant the researcher could only contact a limited number of organisations for this study. As such, the results might not be fully representative of the majority of employees working in the United Kingdom. The same limits (time and financial resources) meant the researcher could not cover other areas of interest which are therefore proposed for future research.

7.7 SUGGESTIONS FOR FURTHER RESEARCH

It was pointed out at the beginning of this research that published research work on employees' environmental awareness organisations is scarce. This study's results point to a number of interesting directions for future research. As is the case in previous studies, even though the results produced by this

study do add to the evidence so far, some aspects of this research still need to be developed further. For instance:

1. This research does not by any means firmly establish a conventional thinking concerning employees' environmental awareness and behaviour as well as organisations' environmental actions. Indeed, it does not confirm correlations between (i) people's education and environmental awareness and behaviour; (ii) people's age and environmental awareness and behaviour; and (iii) people's parental status and their perception of their workplace environmental actions. Yet, the sample used for this study was too small to establish the findings as conventional. Thus, in order to obtain a more 'generalizable' and comprehensive evidence that accounts for these phenomenon, future research may concentrate on the characteristics described earlier and will use larger and broader samples (without restrictions such as focussing on employees only, or on students only).

2. One area is unexplored in this study and it may be considered for future study is a comparative study between residents of developed nation (e.g. France, United Kingdom, USA, etc.) environmental awareness with those of developing (e.g. Brazil, India, Malaysia) or poor nations (e.g. Somalia, Mali, Bangladesh). This could further explain citizens' environmental awareness and behaviour with regard to environmental management. It could enable researchers to find whether or not environmental awareness and behaviour is correlated to the place (country) where people live.

3. This study found that the studied organisations were not environmentally aware and that their environmental actions depended on managers. This suggests that further research is needed to investigate the issue, to identify new concepts which could help achieve managers' environmental awareness and behaviour, or help improve their understanding of 'why sustainability is an important and necessary element of their organisations' growth'. Given the lack of managers' environmental awareness, it is important to add research regarding managers' environmental awareness and behaviours. The aim of such research will be to identify ways to turn managers' reluctance regarding the adoption of environmental green practices into environmentally pro-active actions.

7.8 CONCLUSION: LEARNING FROM EXPERIENCE

The experience gained from this research in particular, and the PhD course in general is a valuable one. The topic of the study was chosen to reflect the author's interest in the field of environmental management. Also, it was to provide insight and experience into an area where the author intended to work in the future. The literature review process offered the opportunity to broaden my knowledge about current thinking on environmental management (concepts and theories), people's knowledge and behavioural attitude with regard to the environment. Moreover, the author has learned some new skills in data collection and analysis. In particular, the opportunity to select

appropriate analytical techniques for tests is the one that the author believes would prove invaluable in his future career. Moreover, the excellent modules taken throughout the course of this PhD have not only enriched the author's knowledge and expertise in his area of concentration—organisations and environmental management—but also in other functional areas of business administration. Coupled with the benefits gained from the wealth of experience brought to the programme by his international colleagues, supervisor and the occasional skills development workshops/seminars, the author believes that he is well poised for the challenges in the fast-paced, ever-changing business world.

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APPENDICES

Appendix A The Principles of Environmental Justice (EJ)

1. Environmental Justice affirms the sacredness of Mother Earth, ecological unity and the interdependence of all species, and the right to be free from ecological destruction.	10. Environmental Justice considers governmental acts of environmental injustice a violation of international law, the Universal Declaration On Human Right, and the United Nations Convention on Genocide.
2. Environmental Justice demands that public policy be based on mutual respect and justice for all peoples, free from any form of discrimination or bias.	11. Environmental Justice must recognise a special legal and natural relationship of Native Peoples to the U.S. government through treaties, agreements, compacts, and covenants affirming sovereignty and self-determination.
3. Environmental Justice mandates the right to ethical, balanced and responsible uses of land and renewable resources in the interest of a sustainable planet for humans and other living things	12. Environmental Justice affirms the need for urban and rural ecological policies to clean up and rebuild our cities and rural areas in balance with nature, honouring the cultural integrity of all our communities, and provided fair access for all to the full range of resources.
4. Environmental Justice calls for universal protection from nuclear testing, extraction, production and disposal of toxic/hazardous wastes and poisons and nuclear testing that threaten the fundamental right to clean air, land, water and food.	13. Environmental Justice calls for the strict enforcement of principles of informed consent, and a halt to the testing of experimental reproductive and medical procedures and vaccinations on people of colours.
5. Environmental Justice affirms the fundamental right to political, economic, cultural and environmental self-determination of all peoples.	14. Environmental Justice oppose the destructive operations of multi-national corporations.
6. Environmental Justice demands the cessation of the production of all toxins, hazardous waste, and radioactive materials, and that all past and current producers be held strictly accountable to the people for detoxification and the containment at the	15. Environmental Justice opposes military occupation, repression and exploitation of lands, peoples and cultures, and other life forms.

point of production.	
7. Environmental Justice demands the right to participate as equal partners at every level of decision-making, including needs assessment, planning, implementation, enforcement and evaluation.	16. Environmental Justice calls for the education of present and future generations which emphasizes social and environmental issues, based on our experience and an appreciation of our diverse cultural perspectives.
8. Environmental Justice affirms the right of all workers to a safe and healthy work environment without being force to choose between an unsafe livelihood and unemployment. It also affirms the right of those who work at home to be free from environmental hazards.	17. Environmental Justice requires that we, as individuals, make personal and consumer choices to consume as little of Mother Earth's resources and to produce as little waste as possible; and make the conscious decision to challenge and reprioritize our lifestyle to ensure the health of the natural world for present and future generations.
9. 8. Environmental Justice protects the right of victims of environmental injustice to receive full compensation and reparations for damages as well as quality health care.	

Source: First National People of Colour Environmental Leadership Summit. (1991), *Principles of environmental Justice*, United Church of Christ Commission for Racial Justice available online at: http://www.ejnet.org/ej/principles.html [accessed on November 28th 2011]

Appendix B UN proposed small set of sustainable development indicators

Indicator domain	**Stock Indicators**	**Flow Indicators**
Foundational well-being	Health-adjusted life expectancy	Index of changes in age-specific mortality and morbidity (place holder)
	Percentage of population with post-secondary education	Enrolment in post-secondary education
	Temperature deviations from normal	Greenhouse gas emissions
	Ground-level ozone and fine particle concentrations	Smog-forming pollutant emissions
	Quality-adjusted water availability	Nutrient loadings to water bodies
	Fragmentation of natural habitats	Conversion of natural habitats to others uses
Economic well-being	Real *per capita* net foreign financial asset holdings	Real *per capita* investment in foreign financial assets
	Real *per capita* produced capital	Real *per capita* net investment in human capital
	Real *per capita* human capital	Real *per capita* net investment in human capital
	Real *per capita* natural capital	Real *per capita* net depletion of natural capital
	Reserves of energy resources	Depletion of energy resources
	Reserves of mineral resources	Depletion of mineral resources

	Timber resource stocks	Depletion of timber resources
	Marine resource stocks	Depletion of marine resources

Copied from United Nations joint report from UNECE/OECD/Eurostat working group on Statistic for sustainable Development (2008).

Appendix C Matrix of environmental indicators

Issues	**Pressure**	**State**	**Response**
Climate change	(GHG emmissions)	Concentrations	Energy intensity; environmental measures
Ozone depletion	(Halocarbon) emissions; production	(Chlorine) concentrations; O_3 column	Protocol sign; CFC recovery; Fund contribution
Eutrophication	(N,P water, Soil) emissions	(N, P, BOD)concentrations	Treatments; Investments/costs
Acidification	(SO_x, NO_x, NH_3) emissions	Deposition, concentrations	Investments, signed agreements
Toxic Contamination	(POC, heavy metal) emissions	(POC, heavy metal) concentrations	Recovery of harzardous waste; investments/costs
Urban Environmental Quality	(VOC, NO_x, SO_x) emissions	(VOC, NO_x, SO_x) concentrations	Expenditures, transportations policy
Biodiversity	Land conversion; land fragmentation	Species abundance compared to virgin area	Protected areas
Waste	Waste generation, industrial, agricultural	Soil/groundwater quality	Collection rate, recycling , investments/costs
Waste Resources	Demand/use intensity, residential/industrial/agricultural	Demand/supply ration; quality	Expenditures water pricing; saving policy
Forest resources	Use intensity	Forestry area degradation; use/sustain growth ration	Protected forestry area; sustainable logging
Fish Resources	Fish catches	Sustainable stocks	Quotas
Soil Degradation	Land use changes	Top soil loss	Rehabilitation/protection

Oceans/Coastal Zones	Emissions; oil spills; depositions	Water quality	Coastal zone management; ocean protection
Environmental Index	Pressure index	State index	Response index

Source: Copied from Hammond, *et al.*. (1995), *Environmental Indicators: A systematic approach to measuring and reporting on environmental policy performance in the context of sustainable development*, Washington, USA: World Resource Institute.

Appendix D The Platform Principles of the Deep Ecology Movement

1. The well-being and flourishing of human and nonhuman Life on Earth have value in themselves (synonyms: intrinsic value, inherent value). These values are independent of the usefulness of the nonhuman world for human purposes.

2. Richness and diversity of life forms contribute to the realizations of these values and are also values in themselves.
3. Humans have no right to reduce this richness and diversity except to satisfy vital human needs.

4. The flourishing of human life and cultures is compatible with a substantial decrease of human population. The flourishing of nonhuman life requires such a decrease.

5. Present human interference with the nonhuman world is excessive, and the situation is rapidly worsening.

6. Policies must therefore be changed. These policies affect basic economic, technological, and ideological structures. The resulting state of affairs will be deeply different from the present.

7. The ideological change is mainly that of appreciating life quality (dwelling in situations of inherent value) rather than adhering to an increasingly higher standard of living. There will be a profound awareness of the difference between big and great.

8. Those who subscribe to the foregoing points have an obligation to directly or indirectly try to implement the necessary changes.

Source: Devall and Sessions (1985:70) Available online at: http://www.ecospherics.net/ [accessed on 31st January 2012]

Appendix E List of contacted organisations

COMPANIES	SECTOR OF ACTIVITIES	COMPANIES	SECTOR OF ACTIVITIES
University of Abertay	Education	**Tayside Fire Station**	Public service
University of Dundee	Education	**Scottish Environment Protection Agency**	Environment
University of Napier	Education	**Scottish Court Service**	Justice
University of Edinburgh	Education	**Edinburgh Fire Station**	Public service
Heriot Watts University	Education	**Lothian Buses**	Transports
TERNA	Energy	**BIS**	Health and Safety
Lloyd Bank	Banking	**Stoneridge Electronics**	Vehicles electronics
Bank of Scotland	Banking	**Interspan Freight Solution**	Freight
Tesco Bank	Banking	**PMG Worldwide**	Freight
Sainsburys Bank	Banking	**ADS Wheelie Bin Services**	Transport
Tesco Retail	Retailer	**MCAREE Recycling**	Collection service
Scot-Mid Cooperative	Retailer	**Midlanf Plastic recycling**	Recycling
Morisson	Retailer	**MPL waste management**	Collection service
Asda	Retailer	**Scotwaste ltd**	Recycling
All Languages Ltd	Language services	**AW Jenkinson Woodwaste**	Recycling
Scottish Widows Edinburgh	Finance	**ABC Rapid Response**	Waste disposal
Blackrock Edinburgh	Finance	**Hamilton Waste recycling**	Waste disposal
YaketyYak	Language services	**Travel Dundee**	Transports
Open to Export	Export	**National Express**	Transports
Mercator Cargo system	Shipping	**The Hairy Coo**	Transports
Lyca	Telecom	**Pest-Away**	Pest control
Lebara	Telecom	**MegaBus**	Transports
T-Mobile	Telecom	**Travel Line**	Transports
Telefonica Ltd	Telecom	**JAM Services**	Outsourcing
Orange	Telecom	**Direct Response Ltd**	Outsourcing
Carphone Warehouse	Telecom	**Answering4u**	Outsourcing
Phone 4U	Telecom	**SYKES**	Outsourcing
Bluecube Telecommunication	Telecom	**Synergy Organisational Solutions**	Outsourcing

TalkTalk	Telecom	**Ansaback**	Call Centre services
Vodafone	Telecom	**UK Call Centre**	Call Centre Services

Appendix F Facsimile sample sent to participants of the focus group

Willy Jouontso

[redacted]

[redacted]

To: [redacted]

Carphone Warehouse

Subject: Regarding the questionnaire workshop event

Hiya [redacted]

Thank you again for agreeing to help me by participating to the small workshop for testing my questionnaire. I am writing you to confirm that there will be in total 10 peoples participating to the event, I am also confirming that they all (including you) agreed for the event to be held on Saturday 18th February 2012 at 7 PM.

To thank you all, I will be providing diner to all (home cooked) and I believe we will have an enjoyable evening. Below are provided details of my address, as well as direction to get there.

[redacted]

[redacted]

[redacted]

[redacted]

I am looking forward seeing you there,

Best regards

Willy

Appendix G Letter enclosed with this research's Questionnaire

Questionnaire to complete for the sole purpose of academic research

Dear Sir / Madam,

I am a PhD researcher at the University of Abertay Dundee and I am currently undertaking research in the field of environmental awareness within organizations (from any industry). The research I am undertaking will investigate employees' environmental awareness at their workplace and the factors behind their non-active or proactive environmental behaviour. The study will also explore the perception of both male and female employees.

I am kindly requesting your help through this questionnaire in order to complete my research. I would like to ask you some questions regarding your status, your knowledge and perception of environmental problems. All your answers will be treated as CONFIDENTIAL and ANONYMOUS and will not be disclosed to a third party. However, my supervisor will have access to my final thesis, which will summarize and analyse all collected data.

Please, note that you may not benefit from my study and that returning the survey will be treated as consent for allowing me to use your data for my thesis analysis. Please note that you can withdraw at any stage by simply not sending back the questionnaire; but it will be highly helpful for me if it is returned. Once completed, please return the questionnaire via either the stamped envelope provided or via the email provided. Please do so by the 30th of May 2012.

I thank you in advance for your help.

Yours sincerely,

Willy Jouontso
PhD researcher
University of Abertay Dundee
1 Bell street, DD1 1HG

Appendix H Sample of the Questionnaire

PLEASE TICK OR CROSS THE BOXES CORRESPONDING TO YOUR ANSWER (EXAMPLE: ☒)

Section 1 – personal details

---

1. **Gender:** ☐ Male ☐ Female

2. **Age range:** ☐ Under 16 ☐ 16-24 ☐ 25-34 ☐ 35-44
   ☐ 45-54 ☐ 55- 64 ☐ 65-74 ☐ 75 - over

3. **Educational :** ☐ < High School ☐ College ☐ Undergraduate ☐ PhD
   ☐ High School ☐ Master ☐ Other (please specify):.....

4. **Do you have children?** ☐ Yes ☐ No

5. **Please state your job title** .....

6. **Are you working:** ☐ Full time? ☐ Part-time?

7. **Please state the sector of activity of your organization**.....

8. **In which country are you located?** .....

9. **What is your organization sector of activities?** .....

Behaviour at personal level

10. **Do you have access to a car?** ☐ Yes ☐ No (go to question 15)

11. **When purchasing or renting a car, is your decision motivated by any of the following (you may select more than one if required):**

    ☐ Brand ☐ City car ☐ speed – Very Fast ☐ Convertible ☐ Coupe

    ☐ Lots of seats ☐ Saloon ☐ Estate ☐ Other (please specify):.....

12. **When purchasing or renting a car, is your decision motivated by any of the following (you can select more than one if required):**

    ☐ Hybrid engines ☐ Petrol ☐ Electrical ☐ Fuel efficiency ☐ Diesel

    ☐ Gas emission level ☐ Eco-friendly ☐ Gas ☐ None ☐ Other

13. **Which of the following do you require the car to have?**

    ☐ Manual gears ☐Automatic gears ☐ Either

14. **What do you use a car for? (you can select more than one if required):**

    ☐ Social/leisure ☐ Domestic ☐ Business ☐ Education ☐Shopping

    ☐ All of the above ☐ Other (please specify): .....

15. **Do you smoke?** ☐ Yes ☐ No

16. **Do you cycle?** ☐ Yes ☐ No (go to question 18)

17. **How often do you cycle to work?**

    ☐ 1 – 2 days a week ☐ 3 – 4 days a week ☐ 5 or more days a week ☐ < 1 month

    ☐ Once a Month ☐ Twice a month ☐ Other (Please specify):.....

18. **Do you use public transport?** ☐ Yes ☐ No (got to question 20)

19. **Please state which of the following public transport do you use and how frequently?**

☐ Bus – **how frequently?** .....

☐ Rapid Transit (Train/Tramway) – **how frequently?** .....

☐ Ferry – **how frequently?** .....

☐ Taxi – **how frequently?** .....

20. **Do you recycle waste at home?** ☐ Yes (go to question 22) ☐ No

21. **Why you do not recycle?**

☐ It is inconvenient ☐ It does not make a difference ☐ Lack of space in my home

☐ Lack of incentive ☐ Too confusing ☐ It does not affect my life

☐ Laziness ☐ It is bad for the environment ☐ I do not believe in global warming

☐ Other (Please specify).....

22. **Which of the following waste do you recycle?**

☐ Paper and cardboard ☐ Packaging ☐ Electronics ☐ Organic ☐ Plastic

☐Cans ☐ Batteries ☐ Glass ☐ Other (please specify).....

23. **When did you start recycling?**

☐ Less than 1 year ago ☐ 1 – 4 years ☐ 5 – 9 years ☐10 – 14 years

☐ 15 – 19 years ☐ More than 20 years ago

24. **What made you decide to recycle? (you may select more than one if required)**

☐ The legislation ☐ To save the environment ☐ To save money

☐ Everyone is doing it ☐ Incentives (e.g. tesco clubcard) ☐ Availability of recycling points

☐ It is good for the economy ☐ "It feels good to do it"

☐ Other (please specify): .....

25. **Do you consider recycling as being part of the culture in your country?**

☐ Yes ☐ No ☐ Do not know

26. **Do you promote recycling amongst your family and friends?** ☐ Yes ☐ No

27. **Do you keep yourself up-to-date regarding environmental issues?** ☐ No ☐ Yes

28. **How do you keep yourself informed of environmental issues?**

☐ Internet search ☐ Newspapers ☐ Contact with environmental organization

☐ TV / Radio ☐ Magazines and other publications ☐ Phone / Tablet (i.e. Iphone)

☐ I do not ☐ Other (please specify): .....

Section 2 – General knowledge of environmental awareness

29. **Based on your opinion, are the following statements True or False?**

(a) **All living beings on the Earth live in interaction with the environment.** ☐ True ☐ False

(b) **The planet different ecosystem are not connected** ☐ False ☐ True

(c) **Environmental pollution is not an important issue** ☐ True ☐ False

(d) **Every human being's action has an impact on the planet ecosystem** ☐ False ☐ True

(e) **Fast food industry contributes to deforestation** ☐ True ☐ False

(f) **Tabacco production damage the environment** ☐ True ☐ False

(g) **Pollution is one of the greatest problems the planet faces** ☐ False ☐ True

(h) **Industrial development can co-exist with a healthy environment** ☐ False ☐ True

(i) **The environment is resilient and always sorts itself out** ☐ True ☐ False

(j) **The environment is resilient, but it has its limits** ☐ False ☐ True

(k) **Water is the source of every living things** ☐ True ☐ False

(l) **Coal production as an alternative energy can benefit the environment** ☐ True ☐ False

(m) **The production of bottle water is environmentally friendly** ☐ False ☐ True

(n) **The ocean is a source of fresh water** ☐ True ☐ False

(o) **Diesel vehicles are better for the environment as they consume less fuel** ☐ False ☐ True

(p) **Increasing nuclear energy production is a great environmentally friendly alternative as it releases less polluting gases** ☐ True ☐ False

30. Burning petroleum oil contributes to which of the following environmental problem

☐ Acid rain ☐ Ozone depletion ☐ Eutrophication ☐ Soil pollution

☐ Hurricane ☐ Increase of oxygen ☐ Water pollution ☐ Dense fog

☐ Radiation pollution ☐ Dense vapour ☐ Global warming ☐ None of the above

31. Which of the following is a cause of acid rain?

☐ Carbon dioxide (CO_2) ☐ Phosphoric acid (H_3PO_4) ☐ Ozone (O_3)

☐ Hydrogen (H) ☐ Nitrogen (N) ☐ Methane (CH_4) ☐ Sulphur dioxide (SO_2)

☐ Oxygen (O) ☐ None

32. Which of the following are renewable resources?

☐ Oil ☐ Plants ☐ Rocks ☐ Water ☐ Coal

☐ Gas ☐ Wind energy ☐ Iron ore ☐ Diamonds ☐ Animals

☐ Wind ☐ The sun ☐ Soil ☐ Humans ☐ None

33. In which of the following do most of the wastes produced in your country end up?

☐ Oceans ☐ Recycling centre ☐ Incinerators ☐ Landfills

☐ Do not know ☐ All the above ☐ Other (please specify): .....

34. To your knowledge, which of the following can be recycled (you may select more than one if required)?

☐ Water ☐ Clothes ☐ Ozone ☐ Plastic ☐ Glass

☐ Antifreeze ☐ Newspapers ☐ Televisions ☐ Food ☐ nuclear waste

35. What removes carbon from the atmosphere (you may select more than one if required)?

☐ Sea water ☐ Birds ☐ Sun ☐ Plants and trees ☐ Soil ☐ Shellfish

☐ Carbonate rock ☐ Do not know

Section 3 - Workplace environmental awareness

Workplace environment policy

36. How many employees does your organization have?

☐ < 2 ☐ 2 – 19 ☐ 20 - 50 ☐ 51 - 250

☐ 251 - 500 ☐ 500 - 1000 ☐ Over 1000 ☐ Do not know

37. Are all the employees located at one facility?

☐ Yes ☐ No ☐ Do not know

38. Does your organization have an explicit policy environmental management for its employees?

☐ Yes ☐ No (Go to question 40) ☐ Do not know

39. Is it published?

☐ No ☐ Yes

40. Does your organization encourage any of the following (you may select more than one if required):

☐ Energy Saving ☐ Waste reduction

☐ The use of public transportation ☐ Green purchasing strategies

☐ Donation to environmental programs ☐ Attending environmental education programs

☐ Water saving facilities/technologies ☐ Recycling

☐ Car-sharing ☐ None

☐ Other (Please specify):.....

41. Does your organization require you to be aware of environmental policy (ies)?

☐ Yes ☐ No (Go to question 45) ☐ Do not know (Go to question 45)

42. Does your organization have a designed individual/department which deals with environmental issues?

☐ No ☐ Yes

43. How does your organization promote its environmental policy and information amongst employees (you mayselect more than one if required)?

☐ Use of Media ☐ University training or courses ☐ In-house Consultant - Environmental training

☐ Implementation of ISO 14000 standards ☐ External consultant - Environmental training

☐ Seminars ☐ Use of employees ☐ Use of suppliers

☐ Other (please specify):.....

44. How far in miles do you work from home?

☐ 1-5 ☐ 5-10 ☐ 10-15 ☐ 15-20 ☐ 20-30 ☐ 30 and more

45. Which of the following facilities do you have at work?

☐ Paper recycling ☐ Batteries recycling ☐ Organics recycling ☐ Electronics recycling

☐ Cardboard recycling ☐ Plastic recycling ☐ Cans recycling ☐ Cartridges recycling

☐ Stationeries recycling ☐ Other (please specify): .....

46. Does your office have any of the following?

(a) Double glazed windows

☐ Yes

☐ No

(b) Printer (s)

☐ No

☐ Yes

i) Do you print lots of documents at work? ☐ Yes ☐ No

ii) Do you re-use printed papers in your work? ☐ No ☐ Yes

(c) Computers

☐ Yes

i) Do you have a screen saver on your computer? ☐ No ☐ Yes

ii) Do you switch off your computer after work? ☐ Yes ☐ No

☐ No

d) Air-conditioning

☐ No

☐ Yes

i) How often do you keep your air conditioning on at work during summer? And during winter?

	Summer	Winter
	☐ 5 or more days a week	☐ 5 or more days a week
	☐ 3-4 days a week	☐ 3-4 days a week
	☐ 1-2 days a week	☐ 1-2 days a week
	☐ Once a fortnight	☐ Once a fortnight
	☐ Once a month	☐ Once a month
	☐ < once a month	☐ < once a month

47. Do you keep the light on in your office?

(a) During office hours ☐ Yes ☐ No

48. Using a scale of 1 to 7, what do you think about the following statement? (1 = strongly disagree; 2 = moderately disagree; 3 = slightly disagree; 4 = neutral; 5 = slightly agree; 6 = moderately agree; and 7 = strongly agree)

(a) It would be cost-effective for my organization to have pro-active environmental management policies

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

(b) My organization is pro-active with environmental management issues

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

(c) Environmental management is an important issue for the development of my organization

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

(d) Environmental education event(s) will improve employees knowledge in my workplace

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

49. Which of the following do you consider as causes of environmental concern(s) in your organization? on a scale of 1 to 7, 7 being the highest please rate each cause? (example: ☒ drinking – ø – 1 – 2 – 3 – 4– 5– 6– 7)

☐ Smoking ☐1 ☐2 ☐3 ☐4 ☐5 ☐ 6 ☐7 ☐Air freshener ☐1 ☐2 ☐3 ☐4 ☐5 ☐ 6 ☐7
☐ Noise ☐1 ☐2 ☐3 ☐4 ☐5 ☐ 6 ☐7 ☐Heating system ☐1 ☐2 ☐3 ☐4 ☐5 ☐ 6 ☐7
☐Light pollution☐1 ☐2 ☐3 ☐4 ☐5 ☐ 6 ☐7 ☐ Waste generation ☐1 ☐2 ☐3 ☐4 ☐5 ☐ 6 ☐7
☐Water usage☐1 ☐2 ☐3 ☐4 ☐5 ☐ 6 ☐7 ☐ Indoor air quality ☐1 ☐2 ☐3 ☐4 ☐5 ☐ 6 ☐7
☐Other (Please state and grade):.....☐1 ☐2 ☐3 ☐4 ☐5 ☐ 6 ☐7

50. Have you ever consulted your superiors about an environmental management issue?

☐ Yes ☐ No

Section 4: Respondents' perception & behaviour with regard to their firm environmental policy

51. Do you feel that more needs to be done regarding your company environmental policy?

☐ Yes ☐ No

52. On a scale of 1 to 7, how satisfied are you with your company's environmental management action? (1 = Extremely satisfied; 2 = moderately satisfied; 3 = slightly satisfied; 4 = neutral; 5 = slightly satisfied; 6 = moderately satisfied; and 7 = extremely satisfied)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7

53. Have you ever influenced your organization's action/behaviour regarding environmental issues?

☐ No (Go to question 55) ☐ Yes

54. Having answered yes at question 54, please explain how you influence on your organization

.....

55. What would encourage you to undertake environmental initiatives within your organization?

☐ I do not require anything to do it ☐ The prospect of improving the company's image
☐ Promotion ☐ Seeing everyone doing it
☐ Incentives (i.e monetary, day off) ☐ Recognition by other
☐ The prospect of reducing the operational cost of the organization
☐ Other (Please state) .....

56. Select three (3) of the following which you think influences the most your organization's environmental policy decision ?

☐ Managers' decisions ☐ Employees' pressure ☐ Pressure from customers
☐ The competition ☐ Pressure from the community
☐ To comply with legislation ☐ Shareholders ☐ Suppliers pressures
☐ The moral factor ☐ Waste disposal cost ☐ Information access
☐ The organization finance ☐ The technological advancement

☐ To explore market for 'green' product or service ☐ To avoid liability costs from non-compliance

☐ To benchmark with other organisations ☐ Other (Please state):.....

57. On a scale of 1 to 7, what is your opinion on the following statement? (1 = strongly disagree; 2 = moderately disagree; 3 = slightly disagree; 4 = neutral; 5 = slightly agree; 6 = moderately agree; and 7 = strongly agree)

(a)	Outside of work I change my behaviours to become more environmentally responsible	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
(b)	Attending an environmental training program can influence the way I perform my duties at work	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
(c)	The lack of information regarding environmental management can influence my organization employees /colleagues environmental actions.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
(d)	My organization environmental actions do not affect the buying behaviour of our customers	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
(e)	Environmental management is an important issue to the customers of my organization	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
(f)	Environmental management is an important issue to my organization's supplier(s)	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
(g)	The lack of financial resource can affect my organization environmental actions	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
(h)	Legislation can certainly influence my organization's actions toward policies with regard to the environment	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7
(i)	Taking environmental proactive measure s can be economically beneficial for my organization	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7

58. Does your organisation collect feedback from employees regarding environmental measures

☐ Yes ☐ No

Thank you for taking the time to complete this questionnaire. Would you like to be interviewed over the next three months to help me with more information about environmental awareness at your work place?

☐ No (thank you for your help)

☐Yes (Please provide below an email address to enable me to contact you for an interview on an agreed date)

.....

If you have any query (ies), please do not hesitate to contact me WILLY JOUONTSO by telephone on 01382 308746 or by email at 0105160@live.abertay.ac.uk

Please return the questionnaire by 30th May 2012 in the envelope provided.

Appendix I Types of regulatory approach to sustainability

The different environmental regulation approaches	description
The "command-and-control" approach (Potoski and Prakash, 2004: 154).	Governments adopt a deterrence enforcement approach which included • full inspection(s) and audit(s) of organisation(s), and • full punishment for every violation (including minor violations) if applicable. Supporters (i.e. Porter, 1991; Porter and Van der Linde, 1995; Crew and Heyes, 2005) of this approach argue that stricter environmental law can: (1) be economically beneficial (as it can stimulate innovation, reduce organisations' costs and enhance the competitive position of organisations located in the country with tighter regulations) Indeed, Gurtoo and Antony (2006) found evidences that strict regulation can generate positive consequence on industries, business structures and countries. These include: - the development of the recycling industry, - a considerable growth of the reusable goods market, - the development of proficient environmental technologies; - all of these can create substantial economic growth in a nation. (2) be environmentally beneficial (as it can reduce the environmental impacts of organisations)
A "cooperative regulatory" framework (Potoski and Prakash, 2004: 153) or "trust-based environmental regulation" (Lange and Gouldson, 2010: 5235).	Under this approach, "openness" is required between stakeholders i.e. governmental agencies, firms (Lange and Gouldson, 2010: 5236). Moreover, governments do implement "regulatory relief programs" (Potoski and Prakash, 2004: 152) such as compliance incentives (i.e. flexibility in choosing ways for achieving regulations requirements, cancelling sanctions, technical assistance, etc.) to organisations for complying with environmental laws.
Hasnas (2009) proposition of 2 approaches: (a) Privatization of the commonly held resources (b) Restricting access to commonly held resources	(a) This approach aims at assigning to an individual the personal right and interest in the protection of a specific resource; Hasnas (2009: 121) argues that by doing so, the law will modify the incentive structure in ways that it will be in the individuals' or organisations' self-interest to operate in ways that protect the relevant resource, thus minimising law enforcement requirement. (b) Hasnas believes that by using governmental legislation the environment can efficiently be protected against overexploitation (for natural resources), or other damages (i.e. restricting access to natural park can protect wildlife and fauna). Hasnas (2009) adds that adequate comparative assessment analysis by governmental body (ies) is essential for implementing the two effective environmental regulations
The use of 'modular environmental regulation as a way for achieving better environmental practices (Freeman and Farber, 2005; Daniel Fiorino, 2006)	Daniel Fiorino (2006) refers to this approach as "new environmental regulation". To the contrary of the 'old regulation' (past regulation) (Fiorini, 2006), he advocates for a framework which: (i) does not automatically assumed the several industries (of a nation) always act responsibly under the menace of legal sanctions or that all firms (in a nation) are the same; secondly (ii) acknowledges the various factors (external and internal) affecting organisations (i.e. shareholders, insurance firms, communities, employees and consumers). Moreover, Fiorini (2006: 194), states that the new regulations should follow principles which: (1) should not depend on a centralized control agency; but (2) should be based on the values of social-political governance and reflexive law (based on shared responsibility and promoting dialogue); (3) the approach must be incentives-based, and included elements of learning and full accountability if required; and (4) the approach must evolve from the focus on compliance from old regulations to embrace a broader environmental performance objective

Sources: Gathered from the following academics: Porter (1991); Porter and Van der Linde (1995); Potoski and Prakash (2004); Crew and Heyes (2005); Freeman and Farber (2005); Gurtoo and Antony (2006); Fiorino (2006); Hasnas (2009); Lange and Gouldson (2010).

Appendix J Independents t-tests for respondent's behavioural questions

Test per campioni indipendenti

		Test di Levene di uguaglianza delle varianze		Test t di uguaglianza delle medie						
									Intervallo di confidenza per la differenza al 95%	
		F	Sig.	t	df	Sig. (2-code)	Differenza fra medie	Differenza errore standard	Inferiore	Superiore
Do you have access to a car?	Assumi varianze uguali	,150	,700	,210	91	,834	,022	,106	-,187	,232
	Non assumere varianze uguali			,210	83,857	,834	,022	,106	-,188	,232
GreenCarHabit	Assumi varianze uguali	,240	,627	1,611	38	,115	,25575	,15875	-,06561	,57712
	Non assumere varianze uguali			1,614	34,882	,115	,25575	,15843	-,06591	,57742
DoYouSmoke	Assumi varianze uguali	2,152	,146	-,720	91	,474	-,051	,071	-,192	,090
	Non assumere varianze uguali			-,737	89,890	,463	-,051	,069	-,188	,086
DoYouCycle	Assumi varianze uguali	,405	,526	,321	91	,749	,030	,093	-,154	,214
	Non assumere varianze uguali			,319	82,298	,750	,030	,093	-,156	,215
Do You Use Public Transportation	Assumi varianze uguali	8,529	,004	-1,599	91	,113	-,15472	,09673	-,34687	,03743
	Non assumere varianze uguali			-1,570	77,678	,121	-,15472	,09856	-,35095	,04151
DoYouRecycleHome	Assumi varianze uguali	6,427	,013	-1,349	91	,181	-,130	,096	-,321	,061
	Non assumere varianze uguali			-1,326	78,287	,189	-,130	,098	-,324	,065
Do you Keep yourself Informed regarding Environment issues? Yes=1; No=0	Assumi varianze uguali	2,610	,110	-2,092	91	,039	-,216	,103	-,421	-,011
	Non assumere varianze uguali			-2,103	85,626	,038	-,216	,103	-,420	-,012
How far in miles do you work from home?	Assumi varianze uguali	,981	,325	,910	91	,365	,289	,318	-,342	,920
	Non assumere varianze uguali			,897	78,914	,373	,289	,323	-,353	,931
EnvironmentalBehaviourAtWork	Assumi varianze uguali	,009	,927	,046	90	,963	,00484	,10502	-,20381	,21349
	Non assumere varianze uguali			,046	81,959	,963	,00484	,10505	-,20415	,21382
Have you ever consulted your superiors about an environmental management	Assumi varianze uguali	2,679	,105	,817	91	,416	,056	,068	-,080	,191
	Non assumere varianze uguali			,794	74,029	,430	,056	,070	-,084	,195
Have you ever influenced your organization's action / behaviour regarding environmental issues?	Assumi varianze uguali	16,940	,000	2,021	91	,046	,162	,080	,003	,321
	Non assumere varianze uguali			1,928	66,866	,058	,162	,084	-,006	,329

Appendix K Behavioural Scores at Personal and Workplace level

Respondents	Behaviour at personal level	Behaviour at work	Respondents	Behaviour at personal level	Behaviour at work	Respondents	Behaviour at personal level	Behaviour at work
Male	3	4	Female	3	3	Female	2	1
Male	1	2	Female	2	2	Female	1	1
Female	2	4	Female	3	2	Male	3	2
Male	2	3	Female	1	3			
Male	2	3	Female	4	3			
Male	4	2	Female	4	4			
Male	2	4	Male	3	1			
Female	3	2	Female	1	2			
Male	4	2	Female	2	1			
Female	1	2	Female	1	2			
Female	2	2	Female	4	4			
Female	3	1	Male	2	1			
Male	1	2	Female	3	2			
Male	1	1	Male	0	3			
Female	1	2	Female	3	1			
Female	2	2	Female	3	1			
Female	4	3	Male	2	1			
Female	1	2	Female	1	2			
Male	2	2	Male	3	4			
Female	2	1	Female	1	2			
Male	3	2	Female	3	1			
Male	2	2	Female	4	1			
Female	2	2	Female	3	2			
Female	3	2	Female	3	4			
Male	3	2	Male	2	4			
Female	1	2	Female	3	3			
Female	1	2	Male	4	4			
Female	2	3	Female	3	1			
Female	2	4	Female	2	1			
Male	2	1	Female	4	3			
Female	2	2	Female	4	2			
Male	1	2	Female	3	1			
Male	1	2	Female	3	3			
Male	1	2	Male	3	3			
Female	3	3	Female	3	2			
Male	3	4	Male	2	4			
Male	3	3	Male	3	2			
Female	2	2	Male	3	2			
Female	1	3	Male	3	3			
Female	3	3	Male	2	1			
Female	3	2	Male	2	2			
Female	4	2	Female	2	2			
Male	2	3	Male	3	2			
Female	3	1	Male	2	3			
Male	2	2	Male	1	3			